

Officer Overexecution: Analysis and Solutions

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August 2015



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This study was sponsored by N9I, Director, Warfare Integration Division.

Abstract



Because the Navy has a closed personnel system, it must access enough surface warfare officers (SWOs) each year to fill future mid-level requirements. Given historical SWO retention, however, the number of SWO accessions needed to fill future mid-level requirements exceeds the junior SWO workload, resulting in officer overexecution (OOE). To evaluate the risk associated with courses of action to address OOE, leadership must understand the SWO accession model and its underlying assumptions. We reviewed the model and recommend which underlying assumptions to use, particularly for SWO retention. We found that SWO retention is significantly affected by the number and experience level of prior-enlisted SWO accessions. We also found that female SWOs with a nuclear subspecialty are the only SWOs whose retention appears to be affected by the level of OOE in their first sea assignment. In addition, we developed an index of economic activity that could be used to help forecast conventional SWO retention.

Background

- Officer overexecution (OOE) occurs when the size of the junior officer (JO) inventory exceeds the number of JO billets authorized
- OOE occurs primarily in the Surface Warfare Officer (SWO) community where current-year accessions are planned to meet future department head (DH) requirements
- OOE is expensive, but filling future requirements may be at risk if the number of SWO accessions is not high enough
- N9I wanted to improve
 - Visibility on the SWO accession planning process
 - Understanding of the factors that affect the accession plan



For much of the last three decades, the Navy junior officer (JO) inventory has exceeded the stated (i.e., authorized) JO requirements. This overage is called “officer overexecution” (OOE). Several officer communities experience OOE, but the condition is most pronounced in the SWO community.

SWO OOE occurs for several reasons. First, like other Navy officer career paths, the SWO career path is essentially closed. SWOs must begin their careers at the juniormost level and work their way up to mid-level positions (i.e., department head (DH) tours). There is no mid-level lateral entry to the SWO community. In addition, the SWO community supplies the restricted line (RL) communities with personnel through various redesignation processes. Thus, the Navy must access sufficient numbers of SWOs each year to ensure that both SWO DH and RL requirements can be filled in the future. Given historical levels of junior SWO retention, however, the annual number of SWO accessions needed to fill future DH and RL requirements exceeds both the amount of junior SWO work that is required on surface platforms and the number of authorized JO billets.

The resource trade-off is that, while it is expensive to carry extra junior personnel, both financially and in terms of training quality, there is risk in not filling future DH and RL requirements if the number of accessions is reduced to match the junior SWO workload. Assessing that risk is an important component of resource allocation. N9I, the Director, Warfare Integration Division, expressed concern about having adequate visibility on the SWO accession planning process and the factors that affect it.

Issues

- How does the SWO accession plan model work?
- How does the SWO accession plan change with changes in underlying model assumptions?
- How well does the Navy's planned increase in junior SWO billets address OOE?
- How can we improve our understanding of SWO retention?



Although OOE has been around for many years, it has received more attention lately as Navy budgets have become increasingly tight. In past years, it has not been clear how the SWO accession plan changed when underlying assumptions changed, such as the percentage of prior-enlisted personnel who may access to the SWO community in the future. Without that understanding, it has been difficult for N9I to assess the risk of actions that could be taken to address OOE while also achieving other Navy goals (e.g., increasing the number of female officers).

In addition, N9I needed an accession plan process that was consistent and repeatable over time so that, when accession plan assumptions were updated from one budget exercise to the next, there was a clear understanding of which underlying assumptions had changed (and why) and how those updated assumptions resulted in a new accession plan.

Recently, the Navy increased the number of SWO JO billets authorized in FY 2016 through FY 2020. Our sponsor also wanted to know the extent to which the planned increase in BA would address OOE.

Finally, a critical component of the accession plan is the assumption made about SWO retention. Many factors affect SWO retention, and there is uncertainty in predicting retention behavior in the future. N9I asked us to examine several factors that may affect SWO retention in order to improve our understanding of that behavior.

Approach

- Review the SWO accession planning model
- Examine how the accession plan changes as underlying model assumptions change
- Estimate how much planned increases in junior SWO billets authorized (BA) will address OOE
- Examine how the SWO retention rate is affected by
 - Prior-enlisted accessions
 - Changes in macroeconomic activity
 - OOE on surface platforms of SWOs' first assignment

We reviewed the SWO accession planning model used by the surface warfare officer community manager. We then estimated a range of accession plans by altering some of the underlying assumptions. This allowed us to identify rule-of-thumb relationships between those underlying assumptions and the accession plan. Next, we considered how the accession plan process worked within and across budget exercises. We also examined the extent to which recent increases in junior SWO billets authorized would address OOE.

We then considered how to improve the forecast of the SWO retention rate. We calculated the contribution of prior-enlisted accessions with different amounts of enlisted service to the overall SWO retention rate. We also estimated the relationship of retention rates and both macroeconomic conditions and the amount of OOE on surface platforms.

Findings

- Review of SWO accession model
 - All else equal, the decrease in prior-enlisted accessions and an increase in female accessions will decrease retention to the DH tour
 - More visibility of the model and more consistency of the planning process over time is needed
- The planned increase in junior SWO billets
 - The increase in BA will substantially address O1-O2 OOE
 - It will have a less certain effect on reducing O3 OOE
- Improving our understanding of SWO retention
 - Prior-enlisted SWO accessions with 4-6 years of service at commissioning are the most likely to stay to the XO/CO screen
 - The conventional SWO retention rate forecast may be more accurate by incorporating a forecast of macroeconomic indicators
 - An *increase* in OOE on platforms appears to positively affect female SWO(N) retention



Our review of the SWO accession plan showed that it should be accompanied by a detailed description of how the key model assumptions are determined—in particular, the forecast of the SWO DH requirements and the forecast of the SWO retention rate. In addition, we describe a consistent process for comparing SWO accession plans within and across budget exercises.

We calculated the expected size of OOE using the planned increase in O1-O3 SWO BA and various accession plans. We found that SWO O1-O2 OOE is likely to be substantially reduced, while the effect on O3 OOE is less certain.

In identifying ways to improve the forecast of the SWO retention rate, we found that the percentages of both female accessions and prior-enlisted accessions have changed considerably in recent years, and assumptions about these groups' shares in future accession cohorts is important to clarify. We calculate a SWO retention rate forecast that includes these accession share changes.

The future SWO retention rate is also likely to be affected by future economic conditions. We found that there is a statistically significant relationship between historical conventional SWO retention rates and an index of macroeconomic activity—an index that includes macroeconomic indicators for which there are forecasts.

We estimated the relationship between SWO retention and actual OOE on surface platforms to which SWOs were first assigned and found that female SWOs with a nuclear subspecialty (SWO(N)s) were the only SWOs for whom the level of OOE on their initial surface platforms appears to have affected their retention behavior. We estimate that, for female SWO(N)s, the greater the OOE at the time that they are assigned to their first surface platforms, the greater their probability of retaining, controlling for other factors that affect the decision.

Recommendations

- Make the SWO accession model and underlying assumptions visible
- Adopt a consistent, repeatable process to compare different SWO accession plans within and across budget exercises
- If addressing OOE remains a priority, stay the course on the planned increase in junior SWO billets
- Include the effect of changes in the share of prior-enlisted SWO accessions on the forecast of the SWO retention rate
- Consider the effect of macroeconomic indicators on the forecast of the conventional SWO retention rate
- Undertake additional analysis to understand if the positive relationship between O2 OOE and the retention of female SWO(N)s can be used to distribute these officers to maximize retention



Based on our findings, we recommend that the details of the SWO accession plan model and the underlying assumptions used in each budget exercise be clear and readily available to leadership. In addition, a consistent, repeatable process should be put in place so that the reasons for changes in accession plans from one budget exercise to the next are clear and easy to follow.

To the extent that addressing OOE through increasing the number of billets authorized for SWO JOs remains a priority, we also recommend that the Navy follow through on the planned increases in O1-O3 junior SWO billets authorized. Note, however, that increasing SWO JO billets addresses OOE somewhat superficially by ensuring that there is an authorized billet for every SWO JO, but it does not increase the work on platforms that is directly associated with accomplishing the mission. Nor does it save the Navy money, although it makes explicit to resource planners how OOE can be addressed through an increase in SWO BA.

Two recommendations concern improving the SWO retention rate forecast. We recommend that recent (and potential future) changes in the shares of prior-enlisted SWO accessions be incorporated into that forecast. We also recommend that a forecast of our macroeconomic indicator index be used to understand the potential effects on the forecast of the conventional SWO retention rate. This could help indicate whether the Navy can expect an increase or decrease in the conventional SWO retention rate in the near future.

Our results suggest that, overall, OOE does not appear to affect SWO retention. The one exception is female SWO(N)s; their retention is positively correlated with the amount of O2 OOE on the platform to which they are first assigned. We recommend further study to determine if the positive relationship between O2 OOE and female SWO(N) retention can help in the development of a distribution plan for female SWO(N)s that maximizes retention.

Glossary



BA	Billets Authorized
CNP	Chief of Naval Personnel
DH	Department Head
DIVO	Division Officer
DOD	Department of Defense
EMC	Enlisted Management Community
FYDP	Fiscal Years Defense Plan
INV	Inventory
ISPP	Integrated Sponsor Program Proposal
JO	Junior Officer
LCS	Littoral Combat Ship
LDO	Limited Duty Officer
LOS	Length of Service
MM	Mission Module
MSR	Minimum Service Requirement
NDAA	National Defense Authorization Act
NESEP	Navy Enlisted Scientific Education Program
NROTC	Naval Reserve Officers Training Corps
OMF	Officer Master File
OOE	Officer Overexecution
POCR	Probationary Officer Continuation and Redesignation
PS	Prior Service
RL	Restricted Line
STA-21	Seaman-to-Admiral Program

Glossary



SWO	Surface Warfare Officer
SW OCM	Surface Warfare Officer Community Manager
SWOCP	Surface Warfare Officer Continuation Pay
SWO(N)	Surface Warfare Officer with a Nuclear Subspecialty
TFMMS	Total Force Manpower Management System
UIC	Unit Identification Code
URL	Unrestricted Line
USNA	United States Naval Academy
XO/CO	Executive Officer/Commanding Officer
YCS	Years of Commissioned Service
YG	Year Group
YOS	Years of Service

Briefing outline

➤ Introduction

- Analysis of tasks 1-4: Approach and findings
- Summary of findings and recommendations

This briefing has three main sections. First, we provide an introduction and background to the study. Second, for each of the four study tasks, we describe the main issues, approach, and findings. We conclude with a summary of the findings and provide recommendations.

What is OOE and why does it matter?

- Surface warfare officer (SWO) inventory substantially exceeds SWO billets in the junior ranks (i.e., the SWO community is “overexecuted”)
- Long-standing issue receiving a lot of attention now because of budget
 - Expensive to overexecute
 - Risky to access too few SWOs such that department head (DH) billets cannot be filled in the future

At historical levels of retention rates, the number of SWO accessions needed each year to fill future mid-level requirements creates a junior SWO inventory that exceeds both the amount junior SWO work on surface platforms as well as the number of authorized junior officer (JO) billets. The Navy calls this “officer overexecution” (OOE). OOE is not limited to the SWO community, but it occurs primarily there.

We make a distinction between the amount of SWO JO work on surface platforms and the number of authorized SWO JO billets. Typically, billets authorized (BA) on board surface ships equals the amount of work that needs to be done to accomplish the mission; however, BA can also include training billets or other positions in excess of the work needed to be done to accomplish the mission. These types of BA reflect the fact that more officers need JO experience on surface platforms in order to fill *future* requirements than there is current work on board. In the past, however, this additional BA has not been explicitly programmed, resulting in OOE.

Although OOE helps ensure that the Navy accesses enough SWOs to fill future requirements, it is expensive both financially and potentially in terms of the quality of JO training. While the Navy has overexecuted for many years to mitigate the risk of not filling future mid-level requirements, OOE has received more attention in recent years as Navy budgets have become tighter and the quality of officer training has come under scrutiny.

Study background and motivation

- During the FY 2014 budget exercise, N9I was not clear on how SWO accessions were forecast or how changing assumptions would affect the forecast (e.g., increase in the percentage of female accessions)
- Lack of understanding/visibility made it hard to evaluate risks associated with alternative resource allocation decisions
- N9I sponsored this study to better understand the SWO accession plan process and to consider options for addressing OOE



Each year, the surface warfare officer community manager (SW OCM) produces a SWO accession plan. The SW OCM accession plan for the current planning year is based on two key forecasts: a forecast of DH tour requirements 8 years in the future and a forecast of the share of SWOs who are expected to be retained from accession to the SWO DH tour. The SWO community also supplies warfare-qualified officers to other officer communities through redesignation processes (i.e., the SWO Option program and lateral transfers), and the SWO accession plan must consider these requirements as well.¹

Navy leaders who make resourcing decisions receive the SW OCM accession plan and must decide whether to accept the plan or to modify it to meet total Navy resource constraints. The resources used to support OOE are a perennial target for reallocation to other areas of the Navy budget. However, there is risk in not meeting future requirements by doing so.

To understand the trade-offs associated with each possible course of action, Navy leadership first needs to understand the details about how the SWO accession plan is constructed and how the accession plan changes when underlying SWO accession model assumptions change. In fact, the lack of visibility on the SWO accession planning process was a key reason for N9I, the Director of Warfare Integration Division, to sponsor this study.

¹ Because the plan depends on these forecasts, we use the terms *accession plan* and *accession forecast* interchangeably.

Briefing outline

- Introduction
- **Analysis of tasks 1-4: Approach and findings**
- Summary of findings and recommendations

This section of the briefing describes the approach, key inputs, analysis, and findings from each of the four tasks.

Study tasking

1. Review the current methodology to forecast SWO accessions
2. Produce a range of SWO accession plans
3. Determine the SWO junior officer (JO) billet authorization needed to eliminate OOE based on results from tasks 1 and 2
4. Examine options that could influence the underlying assumptions in the model



There are four main tasks in this study. For the first task, we review the methodology that was used by the SW OCM to create an accession plan, including all the underlying assumptions and inputs to the model. From this, we develop a baseline accession plan.

For task 2, we produce a range of accession plans that vary based on changes in underlying assumptions in the accession model. Each scenario changes the supply of or the demand for SWOs relative to the assumptions and inputs that created the baseline accession plan.

For task 3, we assume that the accession plan stays constant, and we determine whether the planned increase in junior SWO requirements over the next five years allows every junior SWO to be placed in an authorized billet. In other words, we test whether the planned increase in the junior SWO billet base will eliminate OOE.

For task 4, we worked with our sponsor after the modeling efforts in tasks 1-3 were complete to identify which underlying model assumptions could benefit from additional analysis. We decided that improving the forecast of SWO retention would be particularly useful. We analyze whether various factors affect SWO retention and, if so, how they may be incorporated into the SWO retention forecast.

The next few slides discuss the analysis associated with task 1.

Task 1: Review the currently methodology

Approach

- Receive current version of the SW OCM accession planning model
- Review the model's underlying assumptions and inputs
 - Shipbuilding plan (i.e., expected number and type of ships in service in future fiscal years)
 - DH requirements per platform, on mission modules (MMs), on staffs
 - Historical SWO retention
- Use information to estimate conventional SWO accessions needed to fill future DH requirements
- Describe process to compare different SWO accession plans generated by the model
 - From one budget exercise to the next
 - With accession plans made by various groups (e.g., SW OCM, N131, CNP-approved plan) in the same budget exercise



The SW OCM uses a spreadsheet model to create an accession plan for the current planning year and the next. The underlying model inputs include a forecast of DH requirements 8 years from the accession plan year. For example, the FY 2015 accession plan depends on a forecast of the FY 2023 DH requirements. The forecast of DH requirements itself consists of a forecast of the platforms expected to be in service in FY 2023 and the number of DH billets planned for each platform. The current-year accession plan also depends on the 8-year retention SWO retention rate expected for the incoming SWO accession cohort.

At the beginning of this study, we received a version of the SW OCM accession model for review. To understand the underlying inputs and assumptions used in the model, we also received the Navy's shipbuilding plan as of January 2015. We worked with the SW OCM and PERS-41 to understand how many DH billets were associated with each platform. The SW OCM also provided information on DH tours that are served on staffs or as part of a mission module (e.g., those associated with littoral combat ships (LCSs)).

We used historical data from CNA's officer master files (OMF) on SWO accessions to determine retention rates for the incoming SWO accession cohort from years of commissioned service (YCS) 3 to YCS 8. We then adjusted the number of SWOs in a year group (YG) who retain to YCS 8 to reflect the number who accept the SW continuation pay (SWOCP) bonus. Officers who accept the SWOCP bonus are obligated to serve a DH tour. The data on the total number of SWOCP takers by YG was provided by the SWO OCM.

Some other entities in the Navy also produce accession plans, such as the Head, Officer Plans and Policies in N13. Ultimately, the Chief of Naval Personnel (CNP) approves a plan. We considered the process by which the Navy compares accession plans in the same budget exercise and across budget exercises.

Determine DH requirements

- Start with the shipbuilding plan associated with the President's Budget
- Adjust for any legislation (e.g., cruiser modernization), Department of Defense (DOD) actions, or Navy policy changes not included in shipbuilding plan
- Use conventional SWO DH billets per platform provided by SW OCM and PERS-41
- Calculate the number of first- and second-tour DH billets and the annualized requirement for each tour (baseline assumption: DH tour lengths = 18 months)



The SWO accession model begins with defining the demand for SWO department heads. This requires using the Navy's shipbuilding plan, which includes the number and type of platforms expected to be in service in future years. We use the January 2015 plan.

We made adjustments to the number of platforms expected to be in service in future years due to legislation, administrative actions, or Navy policies that were expected to change the number of platforms in service in future years. For example, the cruiser modernization plan that was passed as part of the FY 2014 National Defense Authorization Act (FY 2014 NDAA) changed the number of cruisers expected to be in service in future years. This was not reflected in the shipbuilding plan as of January 2015.

We then determined the number of DH billets on each platform. The Total Force Manpower Management System (TFMMS) contains a plan for BA through the fiscal years defense plan (FYDP) years and should reflect the workload needs for all of the Navy, including DH billets on surface platforms and staffs. However, TFMMS does not separately identify DH billets. Without specific knowledge of which billets are DH billets and which of the DH billets were allocated to regular SWOs (instead of to limited duty officers (LDOs) or others), we could not tell which of the O3 and O4 SWO billets were DH billets. We worked with the SW OCM and PERS-41 to understand which billets were DH billets associated with each platform and which of those billets were expected to be filled by regular SWOs. The SW OCM also provided information on DH tours that are served on staffs or as part of a mission module (in the case of the LCSs).

Combined, these data determine the number of first- and second-tour DH billets expected in future years. The SWO community plans for 18-month first and second DH tours, so we convert the billets to an annualized demand for personnel. Note that the number of first- and second-tour billets may not be the same.

Task 1: Review the current methodology

Background for forecasting the conventional SWO retention rate

- Definition of retention rate: SWOCP takers/YCS 3 inventory
- Direct SWO accessions versus POCRs
- SWO groups of interest
 - Women
 - Prior enlisted



The second input to the accession plan is an estimate or forecast of the community retention rate of future SWO accession cohorts. Specifically, it is the rate at which SWOs stay in the community to serve in DH tours. The numerator of the retention rate is the number of SWOs from an accession cohort who accept the SWOCP bonus by YCS 8. With few exceptions, accepting SWOCP ensures that takers will complete DH tours.

The denominator of the retention rate is the number of SWOs from each accession cohort who are in the SWO community at YCS 3. The number of SWOs at YCS 3 for a given accession cohort can be made up of officers who accessed directly to the SWO community at commissioning and officers who redesignate to the SWO community from another community. A typical path for officers who redesignate to the SWO community is that they begin training in another community—usually aviation—but are not successful. Depending on the needs of the Navy, these officers may be allowed to go before a Probationary Officer Continuation and Redesignation (POCR) board, which may select them to redesignate to the SWO community. This usually happens by YCS 3. POCR officers (called “POCRs”) who join the SWO community have historically retained at about the same rates as direct accessions to the SWO community.

The retention rate also reflects the behavior of SWO Option officers. These are officers who begin their careers as SWOs with the option to transfer to another community. SWO Options leave the SWO community at very high rates (as expected), typically anywhere from YCS 2 to 4, depending on the Navy policy in effect when they are JOs.

Two groups of (non-Option) officers in the SWO community are of particular interest because, historically, they have retention rates that are different from the community average: women and prior-enlisted accessions. The female retention rate is lower than the average conventional SWO rate (which is driven largely by male conventional SWOs), while prior-enlisted SWOs have higher retention than male conventional SWOs.

Treatment of SWO(N)s (nuclear subspecialty SWOs)

- Exclude SWO(N) data from the SWO accession model
 - The Naval Nuclear Propulsion Program Manager (N133) develops the SWO(N) accession plan separate from the plan developed by the SW OCM
- Later in this briefing, we add the SWO(N) accession plan to our conventional SWO accession plan to compare total SWO inventory to BA



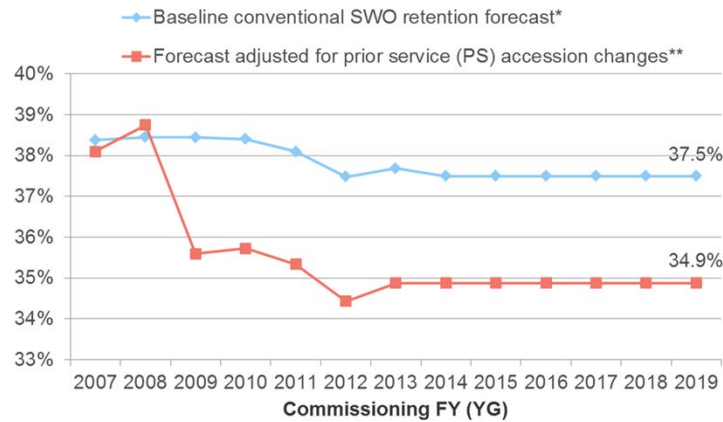
We exclude data on SWOs with a nuclear subspecialty (SWO(N)s) from the accessions model. This is consistent with the Navy practice of having the Naval Nuclear Propulsion Program Manager (N133) develop the SWO(N) accession plan separately from that for conventional SWOs.

For our review of the SW OCM model, we exclude SWO(N)s from the inventory counts, from the calculation of historical SWO retention rates, and from the SWO retention forecast.

When the analysis requires that the total number of SWO accessions be used, we add the SWO(N) accession plan to our conventional SWO accession plan. In particular, when we compare the estimated total SWO inventory to total SWO BA, we include both SWO(N) and conventional SWOs.

Task 1: Review the current methodology

Conventional SWO retention rate forecast



*Excludes nukes and adjusts for actual female accession changes between 2007 and 2014. Then, the female accession percentage is held constant from 2015 to 2019 at 2014 levels.

**Excludes nukes and adjusts for actual PS accession changes between 2007 and 2014. Then, the PS accession percentage is held constant from 2015 to 2019 at 2014 levels.



At the time of this study, we could observe the actual retention rate (SWOCP/YCS 3 inventory) for accession YGs 1995-2006. We used the YG 2002-2006 average retention rate to begin our estimate of the retention rate for YGs 2007-2014 and our forecast of the retention rate for YGs 2015-2019.

This graph shows the estimated (SWOCP/YCS 3 inventory) retention rate for conventional SWO accession YGs 2007-2014 and the forecast of the retention rate for YGs 2015-2019. At the time of this study, we had some *but not complete* retention information for YGs 2007-2010. We could also observe the number of accessions for YGs 2007-2014. (To distinguish periods for which we have partial information on YG accession or retention from periods for which we have no YG accession or retention information, we refer to the former as an estimation period and the latter as a forecast period.)

The percentages of women and prior-enlisted accessions must be considered in the forecast. These two groups are not mutually exclusive, so we measured the contribution to historical retention rates attributable to each group as accurately as possible. Using the observed average conventional SWO retention for YGs 2002-2006 and adjusting for observed changes in the percentages of female and prior-enlisted accessions for YGs 2007-2014, we estimate retention for YGs 2007-2014 and forecast retention for YGs 2015-2019. For YGs 2015-2019, we assume that the female and prior-enlisted percentages of accessions remain constant at 2014 levels. This yields a conventional SWO retention rate forecast of 34.9 percent. Note that this rate includes the effect of SWO Option officers. We are not able to clearly identify SWO Option officers from non-Option officers before FY 2011. For purposes of this forecast, we assume that the SWO Option contribution to the retention rate (both in the YCS 3 inventory and no acceptance of SWOCP) remains constant from 2007 through the estimation and forecast periods.

Calculate the conventional accession plan

- Build the accession plan to the larger of the first and second DH tour annualized requirements
- Determine the conventional SWO accession plan
 - Start with the annualized conventional DH target
 - Account for the historical attrition between first and second DH tours if the target is the second DH tour requirement
 - Apply a forecast of the conventional SWO retention rate (SWOCP takers at YCS 8 / YCS 3 inventory) to determine YCS 3 inventory
 - Add POCRs, lateral-ins
 - Account for conventional SWO attrition before YCS 3



We use the terms *creating an accession plan*, *accession planning*, and *forecasting accessions* somewhat interchangeably because this year's accession plan (for FY 2015) is based on a forecast of surface platforms in service in FY 2023, DH billets per platform, and a forecast of the retention rate for the FY 2015 accession cohort. The accession plan for FY 2016 is based on a forecast of platforms, DH billets, retention to FY 2024, and so on.

The SWO accession model determines this year's accession plan plus several more years. The model is simply a series of steps that backs out the accession plan from the forecast of DH requirements in future fiscal years using the expected retention rate.

Specifically, the determination of the current year's accession plan begins with the annualized DH requirement that we described earlier. If the annualized DH requirement is larger for the second DH tour than the first, we adjust for the (historically) small amount of attrition between the first and the second DH tours (about 3 percent per year). We then apply our forecast of the conventional SWO retention rate (defined as SWOCP takers/YCS 3 inventory)—34.9 percent. At this point, we have an estimate of the number of conventional SWOs needed at YCS 3 to fill the second-tour conventional DH requirements.

The next two steps are taken to ensure that the number of conventional SWO accessions is sufficient to produce the YCS 3 inventory needed. These adjustments account for POCRs who join the SWO community (historically, about 68 per year, although less in recent years), lateral-ins (about 2 per year), and attrition before YCS 3 (about 1.4 percent of the accession cohort).

Task 1: Review the current methodology

Conventional SWO accession forecast results

	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30
Second-tour DHs needed based on shipbuilding plan and DH requirements on each platform	251	263	263	263	267	271	269	267
First DH tour attrition rate	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
First-tour DHs needed	258	271	271	271	275	279	277	275
Retention = (number of SWOCP takers/ YOS 3 inv)	0.349	0.349	0.349	0.349	0.349	0.349	0.349	0.349
Inventory after laterals-in	740	777	777	777	789	800	795	788
Laterals-in	2	2	2	2	2	2	2	2
2 nd DIVO tour inventory before laterals-in	738	775	775	775	787	798	793	786
First tour DIVO attrition rate	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
First tour DIVOs needed	749	786	786	786	798	809	804	797
POCRs who move into the SWO community	68	68	68	68	68	68	68	68
Conventional SWO accessions (includes 65 Options)	681	718	718	718	730	741	736	729
Conventional SWO accessions (excludes 65 Options)	616	653	653	653	665	676	671	664
Options	65	65	65	65	65	65	65	65
Corresponding YG	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22



This slide shows the results of the accession plan model described in previous slides. In FY 2023, we forecast that the annualized conventional SWO second-tour DH requirement is 251. Accounting for losses from the community (i.e., between the first and second DH tours, between YCS 3 and the first DH tour, and between accession and YCS 3) and gains to the community (i.e., POCRs, lateral-ins), the conventional SWO accession plan (including SWO Options) is 681 in FY 2015.

We do not show the shipbuilding plan here because that information is For Official Use Only (FOUO). Requests for that information can be made to the study sponsor. In addition, we do not show the number of DH billets per platform here. That information can be made available on request with the approval of the SW OCM.

In FY 2024, the DH requirement increases to 263 due to changes in the number and types of platforms expected to be in service. More generally, the variation in DH requirements over the FY 2023-2030 period is due to changes in the shipbuilding plan and adjustments to it, such as the cruiser modernization plan.

We use 718 conventional SWO accessions as our (CNA) baseline in analyses later in this briefing. We also remind readers that POCRs can substitute for direct SWO accessions; the conventional SWO accession plan and the assumption made about how many POCRs the SWO community will take in future years must be considered together.

Compare accession plans in the same budget exercise

- Compare the DH requirement-based accession plan with other accession plans, such as
 - Half of SWO O1 BA
 - CNP-approved accession plan
 - Those based on scenarios of interest (an increase in female accessions, an increase in LCS mission modules, etc.)
- Determine the retention rate needed to fill DH requirement under the different accession plans to help analyze risk of each plan

Leadership should be able to easily see the differences in accession plans produced by different groups for the same budget exercise and the risk posed by each for filling future DH requirements



In our review of the SWO accession model, we found that different Navy offices created their own SWO accession plans, sometimes using different underlying assumptions than those used by the SW OCM. Different offices may use different numbers of ships expected to be in service in future years and assumptions about future retention rates. This makes it challenging to compare the various accession plans and to evaluate the risk of each plan in failing to meet future DH requirements. Some accession plans are based not on DH requirements but on division officer (DIVO) tour (i.e., first sea tour) requirements.

To be able to compare plans, we suggest that a model such as the one presented here be used to generate a baseline accession plan for the current fiscal year and across the FYDP. The assumptions that generate the baseline accession plan should be made explicit. Then, scenarios can be run in which an underlying assumption is changed (e.g., the retention rate is increased) to determine the effect on the accession plan as well as the risk of not meeting future DH requirements if accessions are not adjusted. Stakeholders can then discuss the trade-offs of various accession plans using the same information about the model, baseline underlying assumptions, and scenarios.

Such a modeling strategy can accommodate the use of factors other than DH requirements to produce an accession plan. In the case of an accession plan that is not generated by a DH requirements-based model, the plans can still be compared with those based on DH requirements. For example, an accession plan could be generated based on one-half of SWO ensign (paygrade O1) requirements. Since this method of producing an accession plan originates in the same accession plan model framework with the same assumptions about SWO retention and future DH requirements, leadership can have a consistent comparison of the resulting accession plans and the risk of not meeting future DH requirements.

Compare accession plans across budget exercises •

- Start with last budget's accession plan
- Display the effect of changes to the model inputs or assumptions one at a time, for example,
 - In the shipbuilding plan
 - In the retention rate
 - In the DH tour length
- Show the new accession plan

Leadership should be able to easily see why the current accession plan differs from the last one

From one budget exercise to the next, the underlying model assumptions will no doubt be updated to reflect the most recent information on the number of ships expected to be in service and changes in expected retention. To ensure that Navy leadership understands why accession plans change from one budget exercise to the next, the latest plan should be presented in comparison to the next oldest plan with separate identification of each underlying model input or assumption change and its contribution to the difference between the last accession plan and the current one. Leadership will then know precisely why the plan has changed from the last budget exercise.

Task 2

Study tasking

1. Review the methodology currently used to forecast SWO accessions and department head (DH) requirements
2. Produce a range of SWO accession plans
3. Determine the SWO junior officer (JO) billet authorization needed to eliminate OOE based on results from tasks 1 and 2
4. Examine options that could influence the underlying assumptions in the model



To address task 2, we use the SWO accession model described in task 1 to produce a range of accession plans that vary based on changes in underlying assumptions about the supply of and the demand for SWOs.

Approach

- Vary some of the underlying accession model assumptions to estimate the effect on the accession plan and the risk to meeting the DH requirement
 - A. Increase percentage of female SWO accessions from 30 to 40 percent (affects YCS 3-8 retention)
 - B. Vary the number or percentage of lateral transfers out of community (affects YCS 3-8 retention)
 - C. Vary the number and/or operational assumptions for LCS (affects the DH requirement)
 - D. Consider the effects of the cruiser modernization plan on accessions (affects the DH requirement)
- Change the planning target
 - E. Access to the conventional SWO DIVO requirement



Our sponsor was interested in how the conventional SWO accession plan changes with changes in underlying assumptions in the model. In this slide, we show the four scenarios that alter an underlying model assumption to produce a new accession plan and the one scenario that changes the method of producing an accession plan within the same model structure while holding constant the underlying model assumptions. This helps develop rules of thumb for accession planning.

The scenarios include two that change the forecast of the retention rate (scenarios A and B) and two that change the forecast of DH requirements (scenarios C and D). Scenario E does not change underlying model assumptions, but it does change the planning target within the model structure. Specifically, in scenario E, the accession plan is based on the conventional SWO first DIVO tour requirement instead of the future DH requirement.

Findings from accession plan variations

- Summary of results
 - A. Each percentage-point increase in retention (defined as SWOCP takers/YCS 3 inventory) requires about 22 fewer accessions
 - B. The effect of increasing the demand for lateral transfers from the SWO community depends on assumptions about SWO Navy and community stay/leave choices (see appendix A for details)
 - C. Each additional annualized DH requirement requires 3 additional accessions
 - D. The cruiser modernization plan (received from N96 in January 2015) will likely have a modest effect on SWO accessions but a larger effect on DIVO tours available to SWO O1-O2s
 - E. Accessing to the SWO O1 requirement produces a smaller SWO accession plan but potentially increases the risk of not meeting future DH requirements
- Appendix A contains detailed results for each of these scenarios



Holding all else constant in the accessions model, we found that:

- Each percentage-point increase in retention (defined as SWOCP takers/YCS 3 inventory) requires 22 fewer accessions.
- Increasing the demand for lateral transfers to other officer communities by 40 percent must be supported by either an increase in accessions or an increase in the retention rate. The increase in accessions could range from 0 to 90 annually, depending on how many of the additional lateral transfers come from SWOs who were leaving the Navy vice those who were planning to stay in the SWO community. If the additional lateral transfers all come from those who would otherwise leave the Navy, the SWO retention rate and accession plan are unaffected. If the additional lateral transfers all come from those who would otherwise stay in the SWO community, an increase in SWO accessions of 90 per year would be needed to meet future DH requirements.
- Each additional annualized DH requirement requires 3 additional accessions.

For the cruiser modernization plan analysis, we used the plan supplied by N96 in January 2015. At first glance, it appeared that the modernization plan might change DH requirements and therefore the accession plan. We found that the plan is not likely have a great impact on DH requirements and accessions; however, the Navy should prepare for a potentially larger effect of the cruiser modernization plan on reducing DIVO requirements.

Finally, we show that accessing to the SWO O1 requirement decreases the size of the accession plan but increases the risk of meeting the DH requirement.

Appendix A contains descriptions of the approach and findings for each scenario.

Task 3: Determine the JO billet authorization that eliminates OOE

Study tasking

1. Review the methodology currently used to forecast SWO accessions and department head (DH) requirements
2. Produce a range of SWO accession plans
3. Determine the SWO junior officer (JO) billet requirement needed to eliminate OOE based on results from tasks 1 and 2
4. Examine options that could influence the underlying assumptions in the model



In task 3, we were asked to determine the SWO JO requirement needed to eliminate OOE based on the results from tasks 1 and 2. Currently, TFMMS indicates an increase in SWO O1-O3 BA from FY 2016 to FY 2020. Therefore, we approach task 3 as determining whether this planned increase in junior SWO BA will be sufficient to address OOE for various SWO accession plans.

Task 3: Determine the JO billet authorization that eliminates OOE

Approach

- Use a fixed accession plan for each year in FY 2016-2020
- Forecast annual SWO continuation for each YCS in YCS 0-10 to determine O1-O3 SWO inventory each year
- Use plan for SWO and 1000/1050 O1-O3 BA in TFMMS as of January 2015
- Consider additional increases in O1-O3 SWO BA found in the N9 Integrated Sponsor Program Proposal (ISPP) system and in the N8 Program Balance
- Compare O1-O3 SWO inventory to BA in FY 2016-2020
- If SWO inventory > BA, OOE exists and BA is insufficient



These are the steps we used to determine if the planned increase in junior SWO BA is sufficient to address OOE. First, we choose an accession plan and hold it constant from FY 2016 to FY 2020. Using historical one-year continuation rates for the SWO community, we find the inventory at each YCS 0-10 for the accession plan. Then, we spread the O1-O3 SWO and 1000/1050-coded BA over 10 years based on time-in-grade guidelines. Finally, we determine the ratio of inventory to BA at each paygrade. If SWO inventory/BA is greater than one, OOE exists for that paygrade, and the increase in BA is not sufficient to address OOE.

We do this for each paygrade (O1 through O3) and for each fiscal year (FY 2016 through FY 2020).

Task 3: Determine the JO billet authorization that eliminates OOE

Assumptions

- Billets
 - O1 billets span YCS 1 and 2 (first 24 months)
 - O2 billets span YCS 3 and 4 (next 24 months)
 - O3 billets span YCS 5-10 (next 72 months)
 - Allocate 50 percent of O1-O3 1000/1050 billets to the SWO community
- Inventory
 - Must include conventional SWOs, SWO(N)s, and SWO Option accessions
 - Use CNP-approved FY 2015 accession plan = 840 (655 conventional SWOs, 120 SWO(N)s, 65 SWO Options) and hold constant FY 2016-2020
 - Assume SWOCP takers/YCS 3 INV = 33.4% (rate includes conventional SWOs and SWO(N)s)



The billets used for this comparison consist of BA with the SWO or SWO trainee designator for paygrades O1 through O3. In addition, there is BA that is coded for any unrestricted line (URL) officer or special duty officer (1000-coded billets) and for any URL officer who is warfare qualified (1050 billets) for paygrades O1 through O3. We add the O1-O3 1000/1050 BA that is allocated to the SWO community. (Billets coded as 1000/1050 billets are also referred to as non-discrete-coded billets, or simply as non-discrete billets.)

Some key assumptions about billets follow. We spread total O1-O3 SWO and 1000/1050 BA recorded in TFMMS as of January 2015 across 10 years. We allocate O1 SWO and 1000/1050 BA across years 1 and 2, O2 BA across years 3 and 4, and O3 BA across years 5-10.

We also consider two other levels of BA. Since the spring of 2015, the N9 ISPP has reflected an increase O1-O3 SWO BA above the levels in TFMMS to address OOE. In addition, the N8 Program Balance has reflected an increase O3 SWO BA above the increase in SWO BA reflected in the N9 ISPP.

We make several key assumptions about the SWO inventory as well. We must include all SWO accessions and officers who enter the SWO community after accession, including conventional SWOs (including SWO Options), SWO(N)s, and POCRs. For the officers who remain in the SWO community, we assume that they will be assigned to SWO or 1000/1050 billets during their first 10 years as commissioned officers.

While this study was in production, CNP approved an FY 2015 SWO accessions plan. It consists of 655 conventional SWOs, 120 SWO(N)s, and 65 SWO Option accessions. We use this as our accession plan each year from FY 2016 through FY 2020. Our estimate of the retention rate for these accession cohorts is 33.4 percent. This is the conventional SWO continuation rate (including SWO Options and POCRs) that we estimated in task 1 (34.9 percent) adjusted for the inclusion of the historically lower retaining SWO(N)s.

Task 3: Determine the JO billet authorization that eliminates OOE

SWO and 1000-1050 junior BA

TFMMS January 2015					
Paygrade	2016	2017	2018	2019	2020
SWO BA					
O1	1,528	1,534	1,584	1,588	1,603
O2	1,093	1,193	1,327	1,352	1,356
O3	1,407	1,447	1,477	1,511	1,515
1000-1050 BA					
O1	18	18	18	18	18
O2	45	50	56	59	62
O3	699	688	686	684	684
Increases reflected in the N9 ISPP and N8 Program Balance					
Paygrade	2016	2017	2018	2019	2020
N9 ISPP					
O1		250	250	250	250
O2		292	159	159	159
O3		117	117	117	117
N8 Program Balance					
O1		n/a	n/a	n/a	n/a
O2		n/a	n/a	n/a	n/a
O3		166	199	118	116



According to TFMMS as of January 2015, SWO O1-O3 BA is expected to increase from 2016 to 2020. Specifically, O1, O2, and O3 SWO BA are expected to increase by about 5 percent, 24 percent, and 8 percent, respectively.

The numbers of 1000/1050-coded O1-O3 BA are expected to remain the same throughout this period. Note that there are few 1000/1050-coded billets in paygrades O1 and O2 but almost 700 in paygrade O3. The SWO community will not fill all of these billets, however. Some will be allocated to other URL communities and to some RL communities as well. Per N9I direction, we assume that the SWO community is allocated 50 percent of the O1-O3 1000-1050 BA.

As described in the previous slide, the N9 ISPP and the N8 Program Balance have both proposed increases in SWO BA. The upper panel of the lower table shows the N9 ISPP increase in O1-O3 SWO BA. The lower panel of the lower table shows the N8 Program Balance increase in O3 SWO BA.

In the next slide, we show the SWO INV/BA ratios by fiscal year, paygrade by the various levels of BA.

Task 3: Determine the JO billet authorization that eliminates OOE

Results: Ratios of SWO inventory to BA

SWOCP takers/YCS 3 INV retention = 33.4 percent*

50% of O1-O3 1000/1050 billets allocated to SWOs					
Accessions** =	840				
Year end:	2016	2017	2018	2019	2020
O1	1.09	1.09	1.06	1.05	1.04
O2	1.32	1.20	1.08	1.06	1.06
O3	1.20	1.17	1.16	1.14	1.13
Assume ½ of SWOs at YCS 9 fill O4 billets	1.13	1.11	1.10	1.08	1.07

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP SWO BA increase					
Accessions =	840				
Year end:	2016	2017	2018	2019	2020
O1	1.09	0.94	0.91	0.91	0.90
O2	1.32	0.97	0.97	0.95	0.95
O3	1.20	1.10	1.09	1.07	1.07
Assume ½ of SWOs at YCS 9 fill O4 billets	1.13	1.04	1.03	1.01	1.01

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP and N8 Program Balance SWO BA increases					
Accessions =	840				
Year end:	2016	2017	2018	2019	2020
O1	1.09	0.94	0.91	0.91	0.90
O2	1.32	0.97	0.97	0.95	0.95
O3	1.20	1.01	0.98	1.01	1.01
Assume ½ of SWOs at YCS 9 fill O4 billets	1.13	0.96	0.93	0.95	0.95

*In this study, we estimate that the SWOCP taker/YCS 3 INV conventional SWO retention rate = 34.9% in the long run. When SWO(N)s are added, the estimated retention rate decreases to 33.4%.

**CNP-approved SWO accession plan for FY 15 = 655 conventional SWOs+120 SWO(N)s+65 SWO Options=840 total. We assume that no POCRs join the SWO community after commissioning.



This slide shows the results of comparing SWO inventory and BA in paygrades O1-O3 in FY 2016 through FY 2020. We assume that there are 840 total SWO accessions in each fiscal year, the SWOCP taker/YCS 3 retention rate is 33.4 percent, and the SWO community is allocated 50 percent of the O1-O3 1000-1050 BA. (For the most part, the 1000/1050 BA allocation only matters for the O3 inventory/BA calculations).

We also present two scenarios for paygrade O3. In the first, we assume that SWOs with YCS 9 fill only O3 billets and remain in paygrade O3 until YCS 10. In the second scenario, we assume that half of the SWOs with YCS 9 fill O4 SWO billets either because they have promoted to O4 or because, although they are still O3s, they were assigned an O4 billet.

We were told that there was no particular assumption made about POCRs in the development of this accession plan. Thus, in this analysis, we assume that no POCRs join the SWO community.

The results show that using the O1-O3 SWO and 1000-1050 BA reported in TFMMS in January 2015, O1 and O2 OOE are substantially reduced by 2020 (see the top panel of numbers). The OOE in paygrade O3 is also reduced but is still 13 percent (assuming SWOs at YCS 9 do not fill O4 billets).

The second panel shows that the additional O1-O3 SWO BA in the N9 ISPP more than addresses O1-O2 OOE (i.e., BA exceeds INV at O1 and O2), reduces O3 OOE to 7 percent by 2020 assuming SWOs at YCS 9 do not fill O4 billets, and virtually eliminates O3 OOE if some SWOs at YCS 9 fill O4 billets.

The third panel shows that the additional O3 SWO BA in the N8 Program Balance eliminates O3 OOE even if SWOs at YCS 9 do not fill O4 billets; in fact, it produces more O3 BA than inventory if some SWOs at YCS 9 fill O4 billets.

Task 3: Determine the JO billet authorization that eliminates OOE

Findings

- O1-O2 OOE estimate is reduced substantially over time
 - 4% O1 OOE, 6% O2 OOE by FY 2020 without the N9 ISPP SWO BA increase
 - OOE decreases due to a planned increase in SWO O1-O3 BA of 446 (11 percent) from FY 2016 to FY 2020 (reflected in the January 2015 TFMMS)
 - O1 and O2 BA exceeds the respective SWO inventories when the N9 ISPP SWO BA is added
- O3 OOE estimate varies depending on assumptions
 - Factors affecting O3 OOE estimate
 - Time
 - Average YCS of SWOs at promotion to O4 and/or number of O3s who fill an O4 billet
 - Inclusion of N9 ISPP and N8 Program Balance increases in SWO BA
 - High-low estimates of O3 OOE
 - 20% in FY 2016 assuming no promotions to O4 until YCS 10, no SWOs at YCS 9 fill O4 billets and no addition of N9I or N80 SWO BA
 - O3 BA exceeds INV in FY 2020 if some SWOs at YCS 9 fill O4 billets and both the N9 ISPP and N8 Program Balance increases in SWO BA are added
- Estimates of O1-O3 OOE using other assumptions are in appendix B



We find that, in FY 2016, O1 inventory is expected to exceed TFMMS O1 SWO BA (plus the 1000/1050 BA allocation) by about 9 percent. By 2020, however, O1 SWO inventory is expected to exceed BA by only 4 percent. We expect that the O2 inventory will exceed O2 BA by a sizable margin in FY 2016—about 32 percent. By FY 2020, however, inventory is expected to exceed BA by only 7 percent. This is because of the substantial increase in planned SWO O2 BA in TFMMS.

There is less certainty about how much O3 OOE will exist over the next 5 years. If BA is limited to what was reported in TFMMS and no SWOs at YCS 9 fill O4 billets, O3 inventory is expected to exceed BA by about 20 percent in FY 2016. The increase in SWO O3 BA reported in TFMMS is expected to reduce the O3 inventory excess to 13 percent in FY 2020. If half of the YCS 9 inventory fills O4 billets, inventory is expected to exceed BA by 13 percent in FY 2016 and by 7 percent in FY 2020. (See the top panel of results on the previous slide.)

If the N9 ISPP increase in SWO BA is added, we expect O1-O2 BA to exceed inventory beginning in 2017. Also, if no SWOs at YCS 9 fill O4 billets, we expect O3 OOE to decrease to 7 percent by 2020. We expect O3 OOE to be virtually eliminated if some SWOs at YCS 9 fill O4 billets. (See the middle panel of results on the previous slide).

If the N9 ISPP *and* N8 Program Balance increases in SWO BA are added, we expect O3 OOE to be virtually eliminated, and in the case that some SWOs at YCS 9 serve in O4 billets, we expect O3 BA to slightly exceed O3 inventory. (See the bottom panel of results on the previous slide).

Thus, the increase in BA reported in TFMMS is expected to result in a significant reduction in SWO O1 and O2 OOE. Depending on the implementation of the increases to SWO BA in the N9 ISPP and N8 Program Balance and assumptions about how many SWOs fill O4 billets by YCS 9, O3 OOE could be substantially reduced or even eliminated. Appendix B contains scenarios comparing SWO inventory to BA using other assumptions.

Task 4: Improve understanding of SWO retention

Study tasking

1. Review the methodology currently used to forecast SWO accessions and department head (DH) requirements
2. Produce a range of SWO accession plans
3. Determine the SWO junior officer (JO) billet authorization needed to eliminate OOE based on results from tasks 1 and 2
4. **Improve our understanding of SWO retention**



In task 4, we were asked to examine some options that could influence the underlying assumptions in the model. The sponsor was particularly interested in how the SWO retention rate could be better understood and, therefore, forecasted.

Approach: define specific topics of interest

- Determine
 - The optimal time to transition prior-enlisted personnel to the SWO community to maximize retention
 - Whether macroeconomic indicators help predict SWO retention
 - Whether OOE on the platform to which SWOs are first assigned affects retention



We examined three factors that could affect the SWO retention rate and, through analysis, could help us improve our understanding of SWO retention.

First, we analyze how the number and experience level of SWO accessions with prior enlisted service affect the conventional SWO retention rate.

Second, we consider how junior SWO OOE—that is, the actual overmanning of SWO O1 and O2 billets on surface platforms—may affect SWO retention behavior. Serving on a surface platform with a lot of OOE may produce less than ideal conditions. Thus, SWO retention may be affected by the number of JOs in excess of the workload on the platform to which a SWO is first assigned.

The amount of OOE on each surface platform varies; some SWO JOs may be assigned to their first sea tour on a platform with many more SWO O1s and O2s than there are billets, while others may be assigned to platforms with no excess SWO O1 and O2 inventory. We use this variation to estimate the relationship between the level of OOE and SWO retention behavior.

Finally, we consider the effect of the overall U.S. economy on SWO retention. Many stakeholders would like to be able to include expected changes in the economy in the forecast of SWO retention. We estimate the relationship between an index that summarizes the strength of the economy and the SWO retention rate, holding constant the effect of other factors, such as SWO demographic characteristics. Then, using a forecast of the index, we can forecast the expected change in SWO retention.

Approach to the prior-enlisted analysis

- Optimal time to move from enlisted to officer can be defined as
 - Maximizing continuation to the DH tour
 - Maximizing continuation to the XO/CO screen and tour
- Examine historical data on these accessions
 - Length of service at commissioning
 - Continuation in SWO community



Prior-enlisted SWOs already have military service creditable toward retirement when they are commissioned as officers. To be eligible to retire as an officer, they must complete 10 years of commissioned service and 20 years of total military service. As a result, at various points in their commissioned officer careers, prior-enlisted SWOs have different incentives to retain than officers who begin their military service as commissioned officers.

For example, prior-enlisted SWOs with a lot of prior-enlisted service may achieve 10 years of commissioned service and 20 years of total military service by YCS 10 or shortly thereafter. They have little incentive to leave the Navy when they fulfill their officer minimum service requirement (MSR) (around YCS 4 or 5) and much more incentive to leave the Navy when they have met the criteria for retirement as an officer (around YCS 10 or shortly thereafter). By contrast, for officers who begin their military careers at commissioning, the incentive to leave the Navy is greater at YCS 4 or 5—that is, before they have accumulated much time toward retirement—and less so at YCS 10 or more as they approach retirement eligibility.

There is some concern that the more prior-enlisted personnel who are commissioned as SWOs and the more enlisted experience they have, the fewer SWOs who retain to critical SWO career points. As described earlier, the DH tour (at about YCS 8) is a critical SWO career point. In addition, the SWO community would like to have some selectivity at the screen for the executive officer/commanding officer (XO/CO) positions (which occurs at about YCS 12.5).

We define the “optimal” time to access prior-enlisted SWOs in two ways. The first is the enlisted length of service (LOS) at commissioning that maximizes continuation to the DH tour (about YCS 8); the second is the enlisted LOS at commissioning that maximizes continuation to the XO/CO screen (about YCS 12.5).

Task 4: Improve understanding of SWO retention—prior-enlisted analysis

Assumptions for determining the optimal time to transition from enlisted to officer

- Key milestone events
 - DH tour begins at approximately YCS 8
 - Screening for XO/CO fleet-up or for traditional XO positions occurs at approximately YCS 12.5
 - Traditional XO tours begin at approximately YCS 14.5
 - XO/CO fleet-up tours begin at approximately YCS 15.5
- Time in the STA-21 program as a student completing a bachelor's degree counts for calculation of pay but not toward retirement

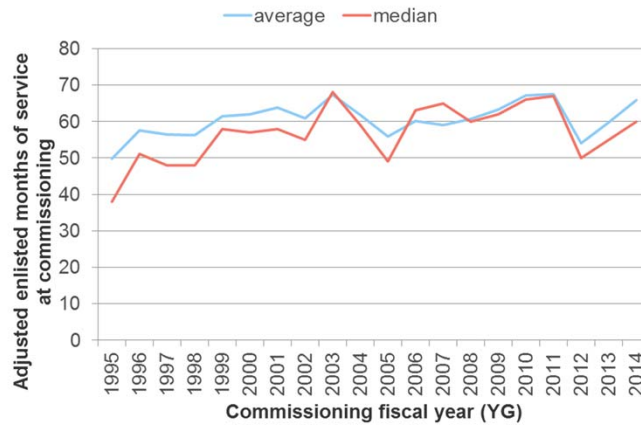


As described above, two key milestone retention points in the SWO career are the DH tour (about YCS 8) and the XO/CO screen (about YCS 12.5). We also note that a traditional XO tour begins at about YCS 14.5, while an XO/CO fleet-up tour begins at about YCS 15.5.

The time that enlisted personnel spend in Navy-funded undergraduate education programs counts toward the calculation of pay as an officer but does not count toward their eligibility for military retirement. Thus, we excluded the time spent in the Seaman-to-Admiral (STA-21) program and other Navy-funded under-graduate programs from the calculation of their prior-enlisted service. As a backup slide in appendix C shows, enlisted personnel in the STA-21 program may spend up to 3 years obtaining their undergraduate degrees.

Task 4: Improve understanding of SWO retention—prior-enlisted analysis

Average adjusted LOS of prior-enlisted personnel at commissioning as SWOs*



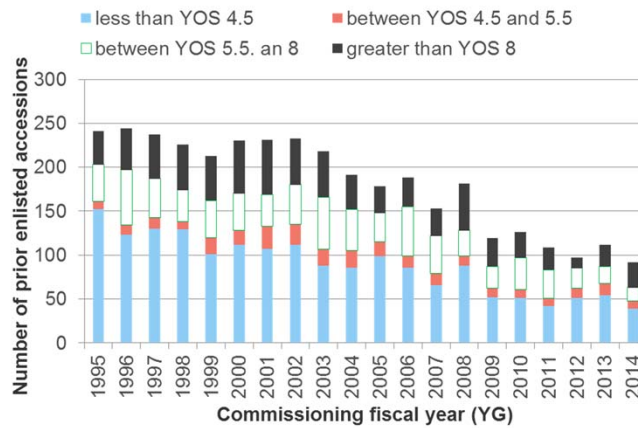
* Length of Service (LOS) is adjusted to reflect only service that counts toward retirement. For example, the time pursuing a bachelor's degree in the STA-21 program does not count toward retirement. We adjusted the LOS of prior-enlisted personnel to exclude their last enlisted assignment if it was as a student in the STA-21 or other enlisted-to-officer program, at a Naval Reserve Officers Training Corps (NROTC) unit, or at a Unit Identification Code (UIC) associated with the United States Naval Academy (USNA).



This slide shows that, in the last 15 years, the average (and median) amount of prior-enlisted service (adjusted for time in Navy funded undergraduate education programs) for prior-enlisted SWO accessions is about 60 months.

Task 4: Improve understanding of SWO retention—prior-enlisted analysis

Distribution of prior-enlisted SWO accessions by adjusted years of service (YOS) at commissioning

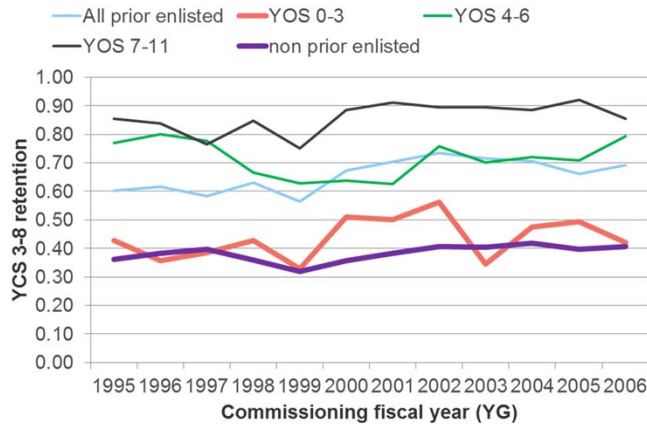


This slide shows other pertinent background information about prior-enlisted SWOs.

First, the data show that the number of prior-enlisted SWOs has decreased in the last 10 years from nearly 250 in YG 1995 to just under 100 accessions in YG 2014. In terms of accession shares (not displayed in this graph), this translates to a decrease in prior-enlisted accessions from roughly 30 percent for YGs 1995 through 2008 to only 15 percent in YG 2009 and after.

Second, even though the average amount of (adjusted) prior-enlisted service has remained relatively constant over the last 15 years at about 5 years of service (see previous slide), the proportions of prior-enlisted SWOs with greater than 8 years of prior-enlisted service and with less than 4.5 years of service have increased.

YCS 3-8 retention for prior-enlisted SWO accessions

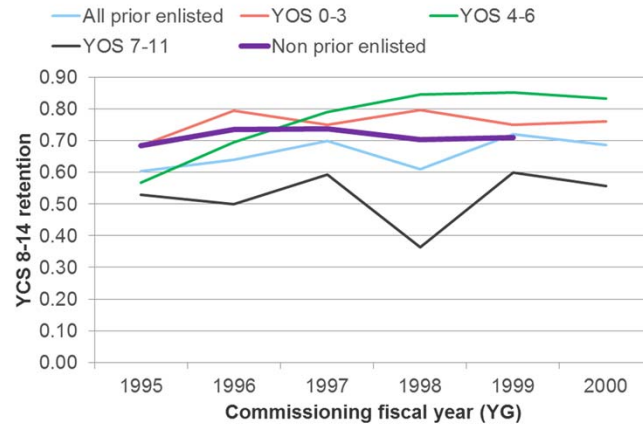


In this slide, we show how YCS 3-8 SWO retention varies by the amount of experience that prior-enlisted SWOs accumulated as enlisted personnel. As a group, prior-enlisted SWOs typically retain better than non-prior-enlisted SWOs (compare the “All prior enlisted” line with the “non prior enlisted” lines on the graph).

As expected, on average, the retention rate for prior-enlisted SWOs is positively correlated with enlisted experience accumulation. Prior-enlisted SWOs with 7 to 11 years of enlisted service in YGs in the 2000s have YCS 3-8 retention rates of about 90 percent. By contrast, prior-enlisted accessions with 3 or fewer years of enlisted service have retention rates that are typically between 40 and 50 percent. The graph shows that if retention to the DH tour is the only criterion for accessing prior-enlisted personnel to the SWO community, the Navy should select prior-enlisted personnel with a lot of prior-enlisted experience.

Note that we do not show the SWOCP taker/YCS 3 retention rates. The data on SWOCP takers that we received from the SW OCM does not distinguish prior-enlisted SWOCP takers from non-prior-enlisted SWOCP takers. Also, the data for graphs include all SWOs—conventional and nuclear, male and female.

YCS 8-14 retention for prior-enlisted SWO accessions



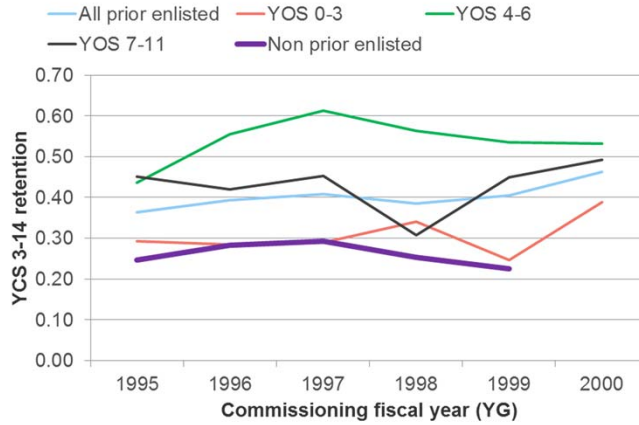
This slide presents very similar information about prior-enlisted SWO retention by enlisted experience accumulation to that in the previous slide except that the retention rates presented here cover a more senior portion of the SWO career. Here we observe retention to YCS 14 for SWOs who retained to YCS 8. This is the retention window that includes the conventional XO and XO/CO screen and, in some cases, the beginning of the XO tour.

Historically, non-prior-enlisted SWOs have YCS 8-14 retention at least as high as the average retention of all prior-service SWOs. For several YGs, non-prior-enlisted SWOs have higher retention than the average of all prior-enlisted SWOs by as much as 10 percentage points.

Prior-enlisted SWOs with 4 to 6 years of enlisted experience appear to be the highest retaining prior-enlisted SWO group in the portion of the SWO career. At the other extreme, prior-enlisted SWOs with 7 to 11 years of enlisted experience are the lowest retaining group. This is almost certainly because these SWOs achieve 20 years of total military service in the YCS 8-14 window and choose to retire. SWOs with prior-enlisted experience of 3 or fewer years appear to retain slightly better than non-prior-enlisted SWOs.

Although prior-enlisted SWOs with 7 to 11 years of enlisted experience have the highest retention to the DH tour, they have the lowest retention thereafter. If the goal is to access prior-enlisted personnel to the SWO community to maximize retention to the DH tour, accessing SWOs with 7 to 11 years of enlisted service would achieve that. The next slide describes what happens if the goal is to access prior-enlisted personnel to maximize retention to the XO/CO screen.

YCS 3-14 retention for prior-enlisted SWO accessions



Combining the information from the previous two slides, we show that retention from YCS 3 to 14 (the XO screen/beginning of the XO tour) is highest for prior-enlisted SWOs with 4 to 6 years of service. Thus, to maximize retention of prior-enlisted SWOs to the XO screen based on prior-enlisted experience alone, the Navy should select those with 4 to 6 years of (adjusted) enlisted experience.

More generally, however, for these YGs, all prior-enlisted SWO groups retain at least as well as non-prior-enlisted SWOs and substantially so in the case of prior-enlisted SWOs with 4 or more years of enlisted service.

Findings

- Number of prior-enlisted SWO accessions has fallen over time
 - 2014 accessions are half the number of 2008 accessions
 - Overall, prior-enlisted accessions have very good retention to DH
 - All else held constant, SWO retention to DH should decrease in the future
- If SWOs access with a lot of prior-enlisted service, they
 - Retain at very high rates to the DH tour
 - Retain at lower rates beyond YCS 11
- For maximizing probability of staying until the XO/CO screen(s) and tours, it appears that accessing those with enlisted YOS 4-6 is best



Our findings include the fact that prior-enlisted SWO accessions fell from almost 200 in the YG 2008 cohort (about 30 percent of all SWO accessions) to less than 100 in the YG 2014 cohort (about 15 percent of SWO accessions). Because prior-enlisted SWOs have much higher retention to both the DH tour and to the XO/CO screen than non-prior-enlisted SWOs, the decrease in the proportion of accessions who are prior enlisted is expected to lower the overall SWO retention rate.

Specifically, we estimate that the decrease in the percentage of prior-enlisted accessions between 2008 and 2014 should lower the overall SWO YCS 3-8 retention rate by about 2.5 percentage points.

Our analysis also showed that prior-enlisted SWOs with 7 to 11 years of enlisted service have the highest retention to YCS 8, while the prior-enlisted SWOs with 4 to 6 years of service have the highest enlisted retention to YCS 14.

If the SWO community increases the percentage of prior-enlisted accessions, this may affect the retention in the enlisted management communities (EMCs) from which these personnel are drawn. In appendix C, we show that, historically, about one-half of prior-enlisted SWOs come from four EMC groups: surface operations, surface engineering, nuclear, and subsurface. The rest of the prior-enlisted SWOs also come from technical EMCs, such as technical aviation and cryptologic technician (CT) EMCs, but the numbers from any one of these other EMCs are small enough that they are not likely to have a significant negative effect on retention in those EMCs.

Approach: modeling SWO retention

- Determine whether we can improve our forecast of SWO retention using a forecast of macroeconomic activity
- Determine whether SWO retention rates are sensitive to OOE on the platform to which they are first assigned
- Use CNA SWO retention model developed for the Assistant Secretary of the Navy (Manpower and Reserve Affairs) ASN(M&RA)



To improve our understanding of SWO retention, our sponsor also asked if we could determine when SWO retention rates may change as a result of changes in economic conditions. At the time of this analysis, CNA had recently completed a model of SWO retention for the Assistant Secretary of the Navy (Manpower and Reserve Affairs) that included an index that summarized U.S. economic activity. Estimates of the model using historical data indicate a statistically significant relationship between the index and SWO retention; however, the index did not include economic measures for which we have a forecast. Thus, the historical relationship between the index and SWO retention was established, but, without a forecast of the index, we cannot incorporate expectations about future economic activity into our forecast of the SWO retention rate.

In this study, we revised the economic index to include only factors for which we have a reliable forecast (the Blue Chip Economic Indicators (BCEI) forecast, or “blue chip” forecast). Then, we reestimate the historical relationship between the new economic index and SWO retention. We can then forecast the SWO retention rate using the forecast of the economic index.

We also wanted to determine if the amount of OOE on surface platforms has an effect on SWO retention. The motivation for this is that junior SWO overcrowding on surface platforms may diminish the quality of service on the platform (and, in particular, the quality of on-the-job training) in a way that may negatively affect SWO retention. Using the same model that includes the revised index of economic activity, we estimate the relationship between SWO retention and the level of OOE on the surface platform to which the SWO is first assigned (i.e., the first DIVO tour).

The SWO retention model and estimation

- Retention is defined from MSR minus one year (MSR-1) to MSR+1
- We use regression techniques to estimate the relationship of retention to observed characteristics of SWOs
- Observed characteristics that may affect the probability of retaining to MSR+1 include
 - Demographics (gender, marital status, parenthood, etc.)
 - Service characteristics (accession source, prior-enlisted service, platform type for first assignment, conventional SWO or SWO(N), etc.)
 - *Index of economic activity (revised from earlier CNA study)*
 - *Amount of O1-O2 OOE on the first assignment platform*



The retention rate used in this part of task 4 is different from the retention rates used in the rest of the study (SWOCP takers/YCS3 or YCS8/YCS3) for two reasons. First, we wanted to capitalize on the SWO retention modeling that had already been done for ASN(M&RA); that modeling focused on retention behavior from MSR-1 to MSR+1. Second, the factors of interest that may have an effect on retention behavior in this analysis—the revised economic index measured just before MSR-1 and the level of OOE on the first assignment platform—likely affect the retention behavior in the early portion of the YCS 3-8 window. Therefore, we use retention from MSR-1 to MSR+1 as our measure of retention in this analysis.

Following the earlier CNA retention model, we also include other observed characteristics of the officers, including a variety of demographic information that has been shown to affect retention, such as gender, marital status, and parenthood. We also include various service characteristics, such as accession source, whether officers have prior enlisted service, the type of platform to which officers were first assigned, and whether officers hold the SWO(N) subspecialty.

The amount of OOE on the platform to which officers are first assigned is measured by counting O1 and O2 SWOs who were assigned to the platform in excess of the billets authorized for the platform. We measure OOE at the beginning of the quarter in which the officer was first assigned.

We used regression techniques to estimate the model with historical data.

Findings

- Using a revised version of the CNA SWO retention model developed for ASN(M&RA), we find the following:
 - A one-unit increase in the forecastable economic index (i.e., a worsening of the economy) increases MSR-1 to MSR+1 SWO conventional retention by 2.6 percentage points
 - A one-person increase in OOE on surface platforms to which SWOs are assigned
 - Does not have a statistically significant effect on MSR-1 to MSR+1 retention of conventional SWOs or male SWO(N)s
 - Increases MSR-1 to MSR+1 retention of conventional female SWO(N)s by 4 percentage points (effect is driven by O2 OOE)
 - The effect of OOE on female SWO(N)s is statistically significant, but small sample sizes makes the estimated magnitude of the effect less precise



We find that the revised economic index (i.e., one that includes only economic measures found in the BCEI forecast) has a statistically significant effect on SWO retention. On average, for every increase of one standard deviation of the index (i.e., indicating a worsening of the economy), we estimate that the conventional SWO retention rate from MSR-1 to MSR+1 increases by 2.6 percentage points. We find no statistically significant relationship between the economic index and SWO(N) retention.

For the OOE analysis, we find that the level of OOE on the surface platform to which the SWOs are first assigned does not have a statistically significant effect on conventional SWO retention for either men or women, nor does it have a statistically significant effect for male SWO(N)s. However, we find a statistically significant positive effect of the level of OOE on retention for female SWO(N)s. All else held constant, we find that the female SWO(N) retention rate increases by 4 percentage points when the amount of O2 OOE on board the surface ship to which they are first assigned is increased by one. Note that the female SWO(N) sample size is not large, so, although we are confident in our finding of a positive, statistically significant relationship between O2 OOE and retention, the precise magnitude of the effect should be viewed with some caution.

The details of the construction of the economic index and the calculation of OOE are described in a CNA information memorandum titled *Officer Overexecution: Analysis and Solutions (Technical Background)* (DIM-2015-U-011420). The information memorandum contains the descriptive statistics for all of the variables used in the estimation of SWO retention and detail on the estimation results.

Briefing outline

- Introduction
- Analysis of tasks 1-4: Approach and findings
- **Summary of findings and recommendations**

In this section, we summarize the findings from the study.

Review the SWO accessions model

- Findings
 - A conventional SWO accession model can be built with the following inputs:
 - The shipbuilding plan
 - The DH requirement on each platform and in staffs
 - A forecast SWO retention to the DH tour
- Recommendations
 - Standardize the SWO accession model and make assumptions transparent to leadership
 - Clearly identify sources for the
 - Forecast of the number of platforms/staffs/modules that will have conventional SWO DH billets (i.e., the shipbuilding plan plus staff/module forecasts)
 - Number of conventional SWO first- and second-tour DH billets per platform/staff/module
 - SWO retention rate forecast
 - Agree on which version of those data to use (e.g., as of a particular date)
 - Define and follow a process for comparing forecasts within and across budget exercises



In our review of the SWO accession model, we found that the model itself is not complicated, but it does require gathering detailed information on the shipbuilding plan and on SWO detailing to DH tours, as well as data on historical SWO retention rates, and changes in the percentage of female and prior-enlisted accessions for more recent YGs. All of these inputs change over time, so it is important that stakeholders agree on which versions will be used for each budget exercise.

Using the shipbuilding plan as of January 2015 and the DH assignment procedures used by PERS-41, we determined annualized conventional DH requirements for FY 2023 through FY 2030. We backed out conventional SWO accession plans for FY 2015 through FY 2022 using a forecast of SWO retention. Our forecasted SWO retention rate of 34.9 percent incorporated the following:

- Historical, fully observed SWOCP takers/YCS 3 inventory rates (i.e., for YGs 2006 and earlier)
- The increase in the percentage of female accessions to 30 percent by YG 2014
- The decrease in the percentage of prior-enlisted accessions from 30 percent to 15 percent between YGs 2008 and 2014

The model inputs and assumptions need to be updated every year. In addition, the process used to compare different accession plans within the same budget exercise and across budget exercises needs to be transparent, documented, and consistent over time.

Produce a range of SWO accession plans

- Findings
 - Rules of thumb have been provided to the sponsor and can be found in appendix A
- Recommendations
 - Rules of thumb will need to be updated periodically



Once we constructed a baseline accession plan for FY 2015 and later, we changed some of the underlying assumptions to understand how alternative scenarios could affect the accession plan. Several findings emerged. First, we found that for every percentage-point increase in SWO retention, accessions could be decreased by about 22. We also found that, given historical retention rates, for every additional annualized DH requirement, there must be almost 3 additional accessions.

We found that, if the percentage of female accessions increased from 30 to 40 percent, (a) our estimate of the conventional SWO retention rate would decrease from 34.9 to 33.3 percent, (b) on a base of 718 conventional SWO accessions (including 68 POCRs), the number of female accessions would increase from about 236 to 330 (94 additional female accessions), and (c) total accessions would have to increase from 718 to 755 (37 accessions). We also found that, if lateral transfers from the conventional SWO community were allowed to grow by 40 percent, accessions would have to increase by about 90 per year (holding retention constant) or retention would have to increase by about 4 percentage points (holding accessions constant).

To accommodate an increase in the number of LCS hulls/crews from 40/60 to 52/78, the Navy can hold conventional SWO retention constant and increase conventional SWO accessions by about 68 per year, or it can hold conventional SWO accessions constant and increase retention by about 3 percentage points (from 34.9 percent to 38 percent).

We also calculated a hypothetical effect on DH requirements of the cruiser modernization plan; but, because the plan is expected to be executed largely within the next 8 years, it does not have an effect on accessions as we model them. Nevertheless, the Navy should consider the implications of a decrease in the number of DIVO billets that will be available for assignment to junior SWOs as the cruisers are modernized.

Determine the JO billet authorization needed to eliminate OOE

- Findings
 - The degree to which OOE will be addressed depends on the
 1. The level of O1-O3 SWO BA that is executed
 2. Share of O1-O3 1000/1050 BA that is allocated to SWOs
 3. Rank of officers at roughly YCS 9-10 and/or percentage of O3 officers who fill O4 requirements
 4. SWO retention rate
 5. SWO accession plan
 - It appears that, if executed, the planned increase in O1-O3 SWO BA
 - Will largely address O1-O2 OOE in the future
 - Will have an uncertain effect on O3 OOE that will depend heavily on 2, 3, and 4 above
- Recommendation
 - If addressing OOE remains a priority, the Navy should follow through on the SWO BA plan reported in the January 2015 TFMMS
 - The Navy should evaluate the costs and benefits of additional increases in SWO BA



To help address OOE, there is a planned increase in O1-O3 SWO BA reported in TFMMS. If the plan is executed, we expect that O1 and O2 OOE will be substantially reduced by FY 2020. The effect of the planned increase in O3 SWO BA on OOE is less certain because it depends on other factors besides the level of O3 SWO BA. It depends on when SWO O3s are promoted to O4, if some senior O3 SWOs are assigned to O4 billets, and if the conventional SWO retention rate remains constant.

Our recommendation is that, if the Navy believes that it is important to have an authorized SWO or 1000/1050 billet for each SWO JO, it should ensure that the increase in SWO BA reported in the January 2015 TFMMS is executed. Furthermore, we estimate the proposed increase in SWO BA reflected in N9 ISPP will eliminate O1 and O2 OOE entirely.

There is more uncertainty about the level of O3 OOE that could occur in the future. For a given accession plan, the level of O3 OOE in the future depends heavily on assumptions made about the SWO retention rate and the number of SWOs who fill O4 billets before they reach YCS 10. The Navy must evaluate the costs and benefits of adding more SWO BA to mitigate those uncertainties.

Note, however, that merely authorizing enough billets for every SWO JO does not address the issue of having enough work and/or limiting training opportunities for these officers. In addition, the authorization of the additional billets does not change the cost to the Navy (i.e., the Navy was paying for these SWO JOs in any case), but it does make the cost of addressing OOE more apparent as the Navy makes resourcing decisions.

Improving our understanding of SWO retention: Optimal time to move prior enlisted to SWO

- Findings
 - SWOs with 4 to 6 years of prior-enlisted service that count toward military retirement have the highest YCS 3 to YCS 14 retention
 - They also have the second highest YCS 3 to YCS 8 retention
- Recommendation
 - If maximizing retention of prior-enlisted SWOs to YCS 14 is of paramount importance, give priority to those with enlisted prior service of 4 to 6 years



In our effort to improve our understanding of SWO retention, we examined how the amount of SWOs' prior enlisted experience affected their commissioned service retention patterns. As a group, SWOs with prior enlisted experience retain to YCS 8 at a much higher rate than non-prior-enlisted SWOs. Among those with prior-enlisted experience, those with a lot—for example, those with 7 to 11 years of enlisted service creditable toward retirement—had the highest retention to YCS 8 of all prior-enlisted groups. In general, the retention rate to YCS 8 increased as prior-enlisted experience increased.

Looking over the entire period of retention from YCS 3 to YCS 14, prior-enlisted SWOs retain better than non-prior-enlisted SWOs, and the group with 4 to 6 years of enlisted service has the highest retention of all. If maximizing retention to the XO/CO screen is a key criterion for selection of prior-enlisted personnel to the SWO community, the Navy should consider increasing the proportion of prior-enlisted SWOs with 4 to 6 years of (adjusted) enlisted service.

Improving our understanding of SWO retention: Modeling SWO retention

- Findings
 - Conventional SWO retention appears to be affected by an index of economic activity that we can forecast
 - Conventional SWO and male SWO(N) retention rates do not appear to be affected by the level of OOE on the platform of first assignment
 - Female SWO(N) retention rates appear to be *positively* affected by the level of O-2 OOE on the platform of first assignment
- Recommendations
 - Incorporate a forecast of the economic index in the forecast of conventional SWO retention
 - Determine whether the positive relationship between OOE and female SWO(N) retention can be used to assign these officers to maximize retention



We use a CNA SWO retention model that was recently developed for ASN(M&RA). We found that an index of macroeconomic activity measured just before MSR-1 was statistically significantly correlated with conventional SWO retention from MSR-1 to MSR+1. In particular a one-standard-deviation increase in the macroeconomic index (a worsening of the economy) increased conventional SWO retention from MSR-1 to MSR+1 by about 2.6 percentage points. Ultimately, the effect of the forecast of the economic activity on the forecast of MSR+1 retention should be considered in the forecast of the SWOCP taker/YCS 3 inventory retention rate.

Using the same retention model, we also tested whether the level of OOE on the platform to which the SWO was first assigned was correlated with the probability of retaining to MSR+1. We found no statistically significant effect for male or female conventional SWOs and male SWO(N)s. The retention behavior of female SWO(N)s, however, appears to be positively affected by OOE on the platform to which they were first assigned. Moreover, they are most sensitive to O2 OOE.

There are many factors that go into the SWO distribution plan. We cannot say at this time how our result on the relationship between O2 OOE and female SWO(N) retention should be considered in the distribution plan. We recommend exploring whether the result can be used to assign these officers to their first platforms in order to maximize their retention.

Appendixes

- Appendix A: Results on producing a range of accession plans
- Appendix B: Estimating SWO O1-O3 OOE using different assumptions
- Appendix C: Additional information on prior-enlisted SWO accessions

Appendix A

- Producing a range of SWO accession plans
 - A. Increase percentage of female SWO accessions to 40% (affects YCS 3-8 retention)
 - B. Vary the number or percentage of lateral transfers out of community (affects YCS 3-8 retention)
 - C. Vary the number and/or operational assumptions for LCS (affects the DH requirement)
 - D. Consider the effects of the cruiser modernization plan on accessions (affects the DH requirement)
 - E. Access to the conventional SWO DIVO requirement



This appendix provides detail on the alternative SWO accession plans that we calculated to compare with our baseline SWO accessions plan. In each alternative plan, we describe the change in the underlying model assumption and the effect on the SWO accession plan.

In scenario A, we increase the percentage of female accessions among conventional SWO accessions from 30 to 40 percent and calculate the effect on the forecast of conventional SWO retention.

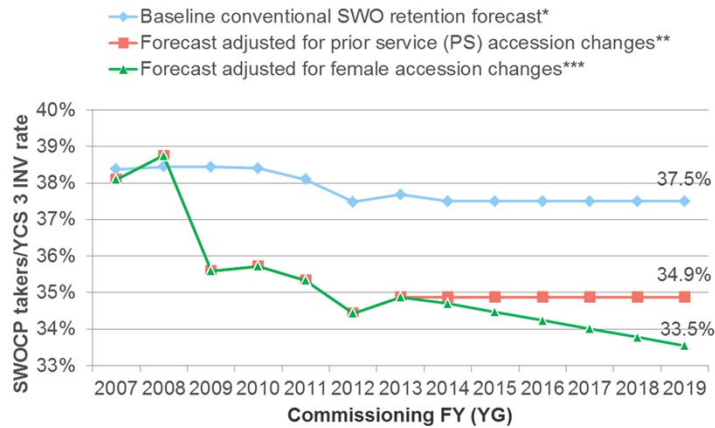
In scenario B, we increase the lateral transfers out of the conventional SWO community by 40 percent from recent levels. Holding constant the forecast of the conventional SWO retention rate, we calculate how many additional accessions would be needed to supply the increase in lateral transfers and still meet the conventional SWO DH requirements. Then, we hold the number of accessions constant and calculate the increase in conventional SWO retention that would support the additional lateral transfers out of the conventional SWO community and meeting the DH requirements.

In scenario C, we increase the number of DH requirements by assuming a larger LCS (and LCS mission module) requirement. Again, we calculate both the number of additional accessions that would be needed to meet the higher DH requirement (holding the conventional SWO retention constant) and the increase in retention that would be required to meet the higher DH requirement if accessions are held constant.

In scenario D, we follow the same methodology as in scenario C except that we decrease DH requirements due to the cruiser modernization plan. We calculate a new accession plan, holding constant the retention rate, and a new retention rate, holding constant the accession plan.

In scenario E, we calculate the accessions needed to fill the annualized DIVO requirement and then the retention rate needed to achieve the DH requirements with that accession plan.

Increase share of female conventional SWO accessions from 30% to 40%



*Excludes nukes and adjusts for actual female accession changes between 2007 and 2014. Then, the female accession percentage is held constant from 2015 to 2019 at 2014 levels.

**Excludes nukes and adjusts for actual PS accession changes between 2007 and 2014. Then, the PS accession percentage is held constant from 2015 to 2019 at 2014 levels.

***Excludes nukes and adjusts for actual PS and female accession changes between 2007 and 2014. Then, the female accession percentage is increased from 30% to 40% from 2015 to 2019.



To estimate the effect of an increase in the percentage of women in the SWO accession cohort, we start by adjusting the forecast of the SWO accessions to account for the effect of other groups in the cohort. As noted, two groups of officers in the SWO community are of particular interest because, historically, they have different retention rates than male conventional SWOs: women and prior-enlisted accessions.

At the time of this study, we could not observe the complete SWOCP taker/YCS 3 rate for YG 2007 and later. However, we can observe how the accession cohorts since 2006 changed with regard to percentages of prior-enlisted accessions and women.

We adjust the calculation of the retention rate for YGs 2007-2014 for the increase in the percentage of female accessions over that time period (an increase of about 22 percent to about 30 percent of accessions). We find that the retention rate decreases by about 0.7 percentage point (from about 38.2 percent to 37.5 percent).

Then, we adjust the calculation of the retention rate for YGs 2009-2014 for the change in the percentage of prior-enlisted accessions (note that YGs 2007 and 2008 had similar percentages of prior-enlisted accessions as earlier YGs). We hold constant the percentage of prior-enlisted personnel of conventional SWO accessions at the YG 2014 level (about 15 percent of accessions) for YGs 2015-2019. We find that the retention rate decreases by about 2.5 percentage points (from 37.5 percent to 34.9 percent).

We then estimate the effect on the retention rate if the female percentage of accessions increases from 30 to 40 percent. We assume that the increased percentage occurs over the FY 2015-2019 period. (This is almost surely too quickly to execute in real time since some accession sources (e.g., USNA and NROTC) would also have to adjust their female percentages.) We find that, by 2019, the SWOCP taker/YCS 3 rate decreases by about 1.4 percentage points (from 34.9 percent to 33.5 percent).

A) Effect of increase in percentage of female accessions •

- Increase the share of conventional SWO female accessions from 30% to 40%
 - On an accession base of ~718 accessions (plus 68 POCRs), female accessions would increase from ~236 to ~330
 - Estimated decrease in SWOCP taker/YCS 3 INV retention is ~1.4 percentage points (34.9% to 33.5%)
 - Total annual accessions needed to produce the same number of DHs must increase from 718 to 755



In the previous slide, we showed how the forecast of conventional SWOCP takers/YCS 3 inventory decreased from 34.9 to 33.5 percent when the share of female accessions increased from 30 to 40 percent. From our estimate of accessions in our baseline model, this means that total conventional SWO accessions must increase from about 718 to 755, and female accessions must increase from about 236 to 330.

In both the baseline (30 percent female accessions) and the new scenario (40 percent female accessions), we assume that there are 68 POCRs. Some of the increase in female accessions could instead come from increasing the total number of POCRs and the number of female POCRs.

B) Effect of an increase in lateral transfers from the conventional SWO inventory

- Assume the demand for lateral transfers from the conventional SWO inventory grows by 40%
- Two groups are potential suppliers of additional lateral transfers
 - Conventional SWOs who would otherwise leave the Navy (i.e., Navy leavers)
 - Officers who would otherwise remain conventional SWOs (i.e., SWO stayers)
- Could potentially lower the retention rate of conventional SWOCP takers/YCS 3
- Size of the retention effect depends on the proportion of the increase in laterals that comes from SWO stayers



The second scenario of interest was to assume an increase in the demand for lateral transfers to other officer communities. Here we assume a 40-percent increase in the demand for lateral transfers from the conventional SWO community.

SWOs considering their first Navy stay/leave decision may be influenced by whether they can laterally transfer to another officer community. If there are no transfers available to another community of interest, SWOs may choose to leave the Navy altogether (i.e., they are Navy leavers). In this case, it is possible that the increased demand for lateral transfers changes a Navy leaver to a Navy stayer, albeit one who transfers out of the SWO community. Such a change in behavior has no effect on the SWO retention rate; the officer leaves the SWO community whether the demand for lateral transfers increases or not.

By contrast, an increase in the demand for lateral transfers may induce some SWOs who would otherwise continue in the SWO community (i.e., SWO stayers) to transfer. Assuming these officers are approved by the lateral transfer board, the SWO retention rate will decrease, all else held constant. To help ensure that SWO DH requirements are met, the number of SWO accessions must increase. Or, the number of accessions could be held constant, but SWO retention would have to increase to achieve the annual DH requirement.

The effect on the SWO retention rate is uncertain because we don't know which officers will respond to an increase in demand for lateral transfers—Navy leavers or SWO stayers. If the increase in demand for lateral transfers is met exclusively by Navy leavers, the baseline SWO accession and retention rates do not have to change to meet SWO DH requirements. If the increase in demand for lateral transfers is met exclusively by SWO stayers, either or both the baseline accession and the retention rates would have to change to meet SWO DH requirements.

Appendix A: Scenario B: Effect of an increase in lateral transfers

Calculation of effect of a 40-percent increase in conventional SWO lateral transfers per year

	Baseline	Increase SWO laterals by 40 percent	Difference
Baseline number of conventional SWO accessions + POCRs	786		
Attrition prior to YCS 3	1.4%		
Conventional SWOs surviving to at least YCS 3	775		
Conventional SWOCP taker/YCS 3 retention rate	34.9%		
1 st tour conventional SWO DHs produced per year	271		
1 st – 2 nd DH tour conventional SWO attrition rate	3%		
2 nd tour conventional SWO DHs produced per year	263		
Estimated number of laterals from SWO community per year*	77	107	+30
Total number of laterals from each YG over YCS 4-8*	77	107	+30
2 nd tour conventional SWO DHs produced per year if additional laterals come from SWO stayers	n/a	233	-30
Change in baseline retention rate due to increase in lateral transfers	34.9%	30.9%	-4 percentage points
Mitigating the increase in transfers (assuming all additional transfers come from conventional SWOs):			
Accessions + POCRs needed to produce 263 2 nd tour DHs per year and 30 additional laterals from the YG when retention = 34.9 percent	n/a	876	+90
Retention needed to produce 263 DHs per year and 30 additional laterals from the YG holding constant accessions+POCRs at 786	n/a	38.9%	+4 percentage points

*FY2004-2009 lateral transfer board data and tabulations from CNA's Officer Longitudinal Files.



Historical data show that there have been about 77 conventional SWOs per year who laterally transfer from the SWO community to another Navy community (usually a restricted line community). These lateral transfers are already accounted for in the 34.9-percent baseline retention rate.

If there is a 40-percent increase in the demand for lateral transfers, and all of that demand is met by conventional SWOs, we would expect to see about 107 lateral transfers from the conventional SWO community each year (an increase from 77). This means an increase in lateral transfers of 30 from each YG (or, more precisely, from each accession cohort plus POCRs). Therefore, each conventional SWO accession cohort (plus POCRs) produces about 30 fewer DHs per year. Effectively, the SWOCP taker/ YCS 3 INV retention rate decreases by 4 percentage points, or from 34.9 to 30.9 percent.

The Navy can address the shortfall in the production of conventional SWO DHs in two ways (or both ways). In the first, the Navy can increase conventional SWO accessions each year by 90. This increases the baseline number of accessions (plus POCRs) to 876. Or, the Navy could hold constant the number of conventional SWO accessions (plus POCRs) at 786 and increase conventional SWO retention from 34.9 percent to 38.9 percent. Finally, the Navy could meet both the conventional SWO DH requirements and the increase in the demand for lateral transfers by a combination of increased accessions and increased retention.

These results are upper bound estimates of the effect of a 40-percent increase in the demand for lateral transfers on the conventional SWO community. Recall that we assume that the increase in demand for lateral transfers is met solely by SWO stayers. If the increase in demand for lateral transfers induces some Navy leavers to stay and laterally transfer, the estimated impact on conventional SWO accessions and retention would be smaller.

C) Effect of an increase in the number of LCSs in service

	Baseline	Increase number of LCS hulls in service	Difference
Number of hulls	40	52	12
Number of crews	60*	78*	18
Number of mission modules (MMs)	54	70**	16
Number of 2 nd tour DH billets (total for crews (1) and MMs (1))	114	148	34
Number of annualized 2 nd tour DH billets assuming 18-month DH tours (total for crews and MMs)	76	99***	23***
Total conventional SWO accessions + POCRs needed to meet DH requirement if SWO retention is 34.9%	786	854	+68
Retention needed to meet DH requirement if conventional SWO accessions + POCRs is 786	34.9%	38.0%	+3.1 percentage points

*Each hull has 3:2:1 manning. Total crews = $40 \times 1.5 = 60$ crews in baseline case and $52 \times 1.5 = 78$ crews when the number of LCS hulls is increased.

**We were unable to obtain a plan for the number of MMs that will be associated with an increase in LCS crews. We assume that there would be on average 0.90 MM associated with each crew (i.e., the ratio observed in the baseline case (54/60)).

***Rounded up to nearest whole requirement.



In scenario C, we consider what would happen to the SWO accession plan if more LCSs are put into service in future years than are currently planned. We start from a base of 40 hulls, which require 60 crews (assumes the 3:2:1 manning scheme, so each hull requires 1.5 crews). The number of second-tour DH requirements is 1 per crew, and the second DH tour is 18 months long. Thus, the annualized second-tour DH requirement for 40 hulls is 40.

Some LCS crews have accompanying mission modules (MMs); others do not. We assume that there will be 54 MMs to accompany the 60 LCS crews. Each MM has one DH, and the DH tour length is 18 months. This creates an annualized DH MM requirement of 36. Combined, the total annualized DH requirement for 40 LCSs and 54 MMs is 76. This is reflected in the baseline conventional SWO accession plan plus POCRs of 786 (718 conventional SWOs (includes 65 Options) plus 68 POCRs).

If the number of LCS hulls increases to 52, the total annualized DH requirement (for both LCS crews and MMs) is 99, an increase of 23 annualized DH requirements from the baseline. Holding retention constant at 34.9 percent, this implies that conventional SWO accessions plus POCRs must increase by 68 (from 786 to 854) to accommodate the increase in annualized DH requirements. Or, if accessions plus POCRs are held constant at the baseline level (786), the retention rate must increase from 34.9 percent to about 38 percent to accommodate the increase in annualized DH requirements.

D) Effect of a change in cruiser DH requirements

- One cruiser per year unavailable for deployment results in 2 fewer annualized 2nd DH tour requirements per year. The Navy can either
 - Hold conventional SWO retention constant at 34.9% and decrease conventional SWO accessions by 6 per year, *OR*
 - Hold the number of conventional SWO accessions constant and allow a 0.3-percentage-point decrease in the retention rate (34.9% to 34.6%)
- If there are 6 nondeployable cruisers per year, the Navy can either
 - Hold conventional SWO retention constant and decrease conventional SWO accessions by 36, *OR*
 - Hold conventional SWO accessions constant and decrease retention by ~1.8 percentage points (34.9% to 33.1%)
- Changes in the accession plan will be an effective response to the cruiser modernization plan only if there is an 8-year lead time (i.e., the number of accessions this year is based on the size of operational fleet 8 years in the future)
- Must also manage the effect of a smaller number of SWO O1 and O2 billets on cruisers due to modernization plan



Scenario D also changes the DH requirements in future years. In scenario D, we consider the cruiser modernization plan. The plan takes a certain number of cruisers out of service for modernization. Each cruiser has two second-tour DH requirements per year. Thus, taking one cruiser out of service lowers the total annualized DH requirement by two.

Using the rule of thumb that each annualized DH requirement is equal to 3 accessions per year, a cruiser modernization plan that takes one cruiser out of service in one year results in decreasing the accession plan by 6. If six cruisers are taken out of service for modernization in a year, this would decrease the SWO accession plan by 36 accessions.

Note, however, that the SWO accession plan is affected only if the change in the DH requirements is at least 8 years in the future. The January 2015 version of the cruiser modernization plan shared by N96 is complete by FY 2023, so it appears that accession plans for FY 2016 and after should not be affected by the cruiser modernization plan.

However, there are a number of DIVO billets on cruisers, and they will not all be available for assignment to SWO JOs when the modernization occurs. This is perhaps the more pressing concern for the SWO community than is the effect of the cruiser modernization plan on the SWO accession plan.

E) Effect of accessing to the conventional SWO DIVO requirement

Conventional SWO accession plan based on:	FY 2016
Annualized conventional DH requirement*	718 (653 non-Option + 65 Option accessions)
Annualized conventional SWO O1 requirement**	655 (590 non-Option + 65 Option accessions)

*The DH requirement is based on the platform counts from the FY 2015 President's Budget shipbuilding plan for FY 2024, a cruiser modernization plan for FY 2024 from N96, a count of staffs with DH billets from the SW OCM, and DH billets per platform/staff from the SW OCM.

The FY 2024 annualized DH requirement is 263. Using a SWOCP taker/YCS 3 INV retention rate of 34.9% and our assumptions from earlier briefings about POCRs (68), laterals in (2), and attrition between first and second DIVO tours (1.4%) and attrition between first and second DH tours (3%), the resulting FY 2016 accession plan is 718.

**Annualized SWO ENS (DIVO) requirement for FY 2015 is found using TFMMS. The goal of this exercise is to determine the level of retention needed in the SWO community to fill the future DH requirement if the accession plan is set to address only the SWO JO workload. Thus, we use the FY 2015 requirement to create the FY 2016 accession plan because the FY 2016 O1 requirement includes billets in excess of the work needed to be done on surface platforms. See the next slide for the retention rate results.



In this slide, we compare the accession plan that is derived from the annualized conventional SWO ensign (O1) requirement for FY 2016 and the plan that is derived from annualized conventional SWO DH requirements in FY 2024.

The SWO O1-based plan is derived from a base of 1,180 O1 conventional SWO requirements (BA) in FY 2015. SWOs are ensigns for 24 months, so the annualized number of SWO O1 officers needed—that is, the accession plan—is 590. Note that we use the FY 2015 SWO O1 BA to create an FY 2016 accession plan. The FY 2015 SWO O1 BA does not include the increase in O1-O3 BA in FY 2016 that is currently programmed to help address OOE (but does not reflect an actual increase in SWO O1 workload).

To make the plan based on the SWO O1 requirement comparable to the plan that is based on the annualized conventional SWO DH requirement, we must add 65 SWO Option accessions. Thus, the total conventional SWO accession plan based on O1 BA including SWO Options is 655.

Note also that the 718 accession plan assumes that there are 68 POCRs who will join the FY 2016 SWO accessions in the early years of their Navy careers.

Conventional SWO retention needed to meet DH requirement under each accession plan

FY 2016 accession plan based on*	POCR assumption**	
	POCRs = 68	POCRs = 0
DH requirement	34.9%***	38.2%
SWO ENS requirement	38.0%	41.9%

*The FY 2024 annualized DH requirement is 263 (corresponds to FY16 accessions).

**POCRs are assumed to have a retention rate to the DH tour equal to that assumed for accessions.

***This is the rate used in this study's baseline conventional SWO accession plan. It assumes that the SWO community will receive 68 PCR's.



In this slide, we show the SWOCP taker/YCS 3 inventory retention rate that must be achieved if the FY 2024 annualized conventional SWO DH requirement is met. For the baseline accession plan targeting the future DH requirement, and assuming 68 PCR's join the SWO community, a retention rate of 34.9 percent is needed to meet the future DH requirement. If no PCR's are allowed into the SWO community, the retention rate must increase to 38.2 percent to meet the future DH requirement.

For the alternative accession plan targeting SWO O1 requirements, and assuming that 68 PCR's join the SWO community in the early years of their careers, the cohort of officers must have a retention rate of 38.0 percent to meet future DH requirement. Without PCR's joining the cohort, these officers must have a retention rate of 41.9 percent to meet the future DH requirement.

Appendix B



Appendix B gives some additional information on estimates of SWO OOE using different SWO retention rates, accession plans, and assumptions about shaping the O3 SWO inventory through a POCR process to move O3 SWOs to another officer community or out of the Navy.

Appendix B

Ratios of SWO inventory to BA assuming a higher retention rate

SWOCP takers/YCS 3 INV retention = 37.4 percent*

50% of O1-O3 1000/1050 billets allocated to SWOs					
Accessions** =	840				
Year end:	2016	2017	2018	2019	2020
O1	1.09	1.09	1.06	1.05	1.04
O2	1.32	1.20	1.08	1.06	1.06
O3	1.28	1.26	1.24	1.21	1.21
Assume ½ of SWOs at YCS 9 fill O4 billets	1.21	1.18	1.17	1.15	1.14

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP SWO BA increase					
Accessions =	840				
Year end:	2016	2017	2018	2019	2020
O1	1.09	0.94	0.91	0.91	0.90
O2	1.32	0.97	0.97	0.95	0.95
O3	1.28	1.18	1.16	1.14	1.14
Assume ½ of SWOs at YCS 9 fill O4 billets	1.21	1.11	1.10	1.08	1.08

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP and N8 Program Balance SWO BA increases					
Accessions =	840				
Year end:	2016	2017	2018	2019	2020
O1	1.09	0.94	0.91	0.91	0.90
O2	1.32	0.97	0.97	0.95	0.95
O3	1.28	1.08	1.05	1.08	1.08
Assume ½ of SWOs at YCS 9 fill O4 billets	1.21	1.02	0.99	1.02	1.02

*N96 and the SWO OCM use a 37.4% SWOCP takers/YCS 3 INV retention rate that includes conventional SWOs and SWO(N)s.

**CNP-approved SWO accession plan for FY 15 = 655 conventional SWOs+120 SWO(N)s+65 SWO Options=840 total. We assume that no POCRs join the SWO community after commissioning.



This slide shows SWO inventory to BA ratios using the CNP-approved accession plan for FY 15 but with a 37.4 percent retention rate. The higher retention rate is closer to that currently used by the SW OCM.

The results for O1 and O2 OOE are the same as those using a 33.4 percent retention rate. However, we estimate that O3 OOE would not be eliminated by the increase in SWO BA reflected in the N9 ISPP as it is when we use the lower retention rate.

If the higher retention rate is assumed, it would be necessary to execute the January 2015 TFMMS BA program and add both the N9 ISPP and N8 Program Balance increases in SWO BA to reduce O3 OOE by about the same amount as when we assume the lower retention rate and the TFMMS plus N9 ISPP SWO BA levels.

Appendix B

SWO inventory to BA ratios with various accession assumptions and retention = 33.4%*

50% of O1-O3 1000/1050 billets allocated to SWOs															
Accessions**=	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	1.01	0.97	0.97	0.96	1.09	1.09	1.06	1.05	1.04	1.18	1.18	1.14	1.14	1.13
O2	1.21	1.11	1.00	0.98	0.98	1.32	1.20	1.08	1.06	1.06	1.42	1.30	1.17	1.15	1.14
O3	1.10	1.08	1.07	1.05	1.05	1.20	1.17	1.16	1.14	1.13	1.29	1.27	1.25	1.22	1.22
Assume % of SWOs at YCS 9 fill O4 billets	1.05	1.03	1.01	0.99	0.99	1.13	1.11	1.10	1.08	1.07	1.22	1.20	1.18	1.16	1.16

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP SWO BA increase															
Accessions**=	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	0.87	0.84	0.84	0.83	1.09	0.94	0.91	0.91	0.90	1.18	1.01	0.98	0.98	0.97
O2	1.21	0.90	0.89	0.88	0.88	1.32	0.97	0.97	0.95	0.95	1.42	1.05	1.05	1.03	1.02
O3	1.10	1.02	1.00	0.99	0.98	1.20	1.10	1.09	1.07	1.07	1.29	1.19	1.17	1.15	1.15
Assume % of SWOs at YCS 9 fill O4 billets	1.05	0.96	0.95	0.93	0.93	1.13	1.04	1.03	1.01	1.01	1.22	1.13	1.11	1.09	1.09

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP and N8 Program Balance SWO BA increases															
Accessions**=	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	0.87	0.84	0.84	0.83	1.09	0.94	0.91	0.91	0.90	1.18	1.01	0.98	0.98	0.97
O2	1.21	0.90	0.89	0.88	0.88	1.32	0.97	0.97	0.95	0.95	1.42	1.05	1.05	1.03	1.02
O3	1.10	0.94	0.91	0.93	0.93	1.20	1.01	0.98	1.01	1.01	1.29	1.09	1.06	1.09	1.09
Assume % of SWOs at YCS 9 fill O4 billets	1.05	0.89	0.86	0.88	0.88	1.13	0.96	0.93	0.95	0.95	1.22	1.04	1.01	1.03	1.03

*In this study, we estimate that the SWOCP taker/YCS 3 INV conventional SWO retention rate = 34.9% in the long term. When SWO(N)s are added, the estimated retention rate decreases to 33.4%.

**N13 accession plan (590 conv. SWOs + 120 SWO(N)s + 65 Options = 775; assumes no POCRs), CNP approved plan (655 conv. SWOs + 120 SWO(N)s + 65 Options = 840; assumes no POCRs), and this study's plan (653 conv. SWOs (includes Options) + 120 SWO(N)s + 65 Options = 838 accessions; assumes 68 POCRs), respectively.



This slide shows the results of comparing inventory to BA for different accession plans when we assume a 33.4 percent retention rate. The middle column (in red) is the same information displayed and described earlier in the brief.

The panel of data to the left uses the accession plan that is based on SWO O1 requirements, 65 SWO Option accessions, and 120 SWO(N) accessions for a total of 775 SWO accessions. It also assumes that there are no POCRs who join the SWO community after commissioning. Because this is the lowest accession plus POCRs plan, it generates the least amount of OOE at every paygrade and in every year. In fact, O3 BA may exceed O3 inventory even without adding the N9 ISPP or N8 Program Balance increases in BA.

The panel of data to the right uses the accession plan that is based on FY 2024 annualized conventional SWO DH requirements, 653 non-Option conventional SWO accessions, 65 Option accessions, and 120 SWO(N) accessions for a total of 838 SWO accessions. It also assumes that 68 POCRs will join the SWO community each year. This is the highest accession plan plus POCRs; by design, it is estimated to achieve the future DH requirement given the retention rate assumption. When we assume that only TFMMS BA is programmed, it does not eradicate OOE at any of the paygrades. However, O1 and O2 OOE are virtually eliminated when the N9 ISPP increase in BA is added, and O3 OOE is substantially reduced when both the N9 ISPP and N8 Program Balance increases in BA are added.

Appendix B

SWO inventory to BA ratios with various accession assumptions, retention = 33.4%*, and 60 POCRs out

50% of O1-O3 1000/1050 billets allocated to SWOs															
Accessions**=	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	1.01	0.97	0.97	0.96	1.09	1.09	1.06	1.05	1.04	1.18	1.18	1.14	1.14	1.13
O2	1.21	1.11	1.00	0.98	0.98	1.32	1.20	1.08	1.06	1.06	1.42	1.30	1.17	1.15	1.14
O3	1.07	1.05	1.03	1.01	1.01	1.16	1.14	1.12	1.10	1.10	1.26	1.23	1.21	1.19	1.19
Assume ½ of SWOs at YCS 9 fill O4 billets	1.01	0.99	0.98	0.96	0.96	1.10	1.08	1.06	1.04	1.04	1.19	1.17	1.15	1.13	1.13

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP SWO BA increase															
Accessions**=	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	0.87	0.84	0.84	0.83	1.09	0.94	0.91	0.91	0.90	1.18	1.01	0.98	0.98	0.97
O2	1.21	0.90	0.89	0.88	0.88	1.32	0.97	0.97	0.95	0.95	1.42	1.05	1.05	1.03	1.02
O3	1.07	0.99	0.97	0.95	0.95	1.16	1.07	1.05	1.04	1.04	1.26	1.16	1.14	1.12	1.12
Assume ½ of SWOs at YCS 9 fill O4 billets	1.01	0.93	0.92	0.90	0.90	1.10	1.01	1.00	0.98	0.98	1.19	1.10	1.08	1.06	1.06

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP and N8 Program Balance increases															
Accessions**=	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	0.87	0.84	0.84	0.83	1.09	0.94	0.91	0.91	0.90	1.18	1.01	0.98	0.98	0.97
O2	1.21	0.90	0.89	0.88	0.88	1.32	0.97	0.97	0.95	0.95	1.42	1.05	1.05	1.03	1.02
O3	1.07	0.91	0.88	0.90	0.90	1.16	0.99	0.96	0.98	0.98	1.26	1.06	1.03	1.06	1.06
Assume ½ of SWOs at YCS 9 fill O4 billets	1.01	0.86	0.83	0.85	0.85	1.10	0.93	0.91	0.93	0.93	1.19	1.01	0.98	1.00	1.00

*In this study, we estimate that the SWOCP taker/YCS 3 INV conventional SWO retention rate = 34.9% in the long term. When SWO(N)s are added, the estimated retention rate decreases to 33.4%.

**N13 accession plan (590 conv. SWOs + 120 SWO(N)s + 65 Options = 775; assumes no POCRs in), CNP approved plan (655 conv. SWOs + 120 SWO(N)s + 65 Options = 840; assumes no POCRs in), and this study's plan (653 conv. SWOs (includes Options) + 120 SWO(N)s + 65 Options = 838 accessions; assumes 68 POCRs in), respectively.



We also calculated the SWO inventory to BA ratios when we assume that the Navy employs a more vigorous POCR policy that moves some SWOs to other officer communities or out of the Navy entirely. In this slide, we show the results when we assume that 30 officers are moved out of the SWO community in each of YCS 4 and YCS 5. In other words, we move a total of 60 POCRs out of the community.

Compared to the results presented in the previous slide, this “POCRs out” policy lowers the O3 inventory to BA ratios by 2 to 3 percentage points.

Appendix B

SWO inventory to BA ratios with various accession assumptions, retention = 33.4%*, and 120 POCRs out

50% of O1-O3 1000/1050 billets allocated to SWOs															
Accessions**=	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	1.01	0.97	0.97	0.96	1.09	1.09	1.06	1.05	1.04	1.18	1.18	1.14	1.14	1.13
O2	1.21	1.11	1.00	0.98	0.98	1.32	1.20	1.08	1.06	1.06	1.42	1.30	1.17	1.15	1.14
O3	1.04	1.02	1.00	0.98	0.98	1.13	1.11	1.09	1.07	1.07	1.22	1.20	1.18	1.16	1.16
Assume % of SWOs at YCS 9 fill O4 billets	0.98	0.96	0.94	0.93	0.93	1.07	1.05	1.03	1.01	1.01	1.16	1.13	1.12	1.10	1.09

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP SWO BA increases															
Accessions**=	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	0.87	0.84	0.84	0.83	1.09	0.94	0.91	0.91	0.90	1.18	1.01	0.98	0.98	0.97
O2	1.21	0.90	0.89	0.88	0.88	1.32	0.97	0.97	0.95	0.95	1.42	1.05	1.05	1.03	1.02
O3	1.04	0.95	0.94	0.92	0.92	1.13	1.04	1.02	1.01	1.00	1.22	1.13	1.11	1.09	1.09
Assume % of SWOs at YCS 9 fill O4 billets	0.98	0.90	0.89	0.87	0.87	1.07	0.98	0.97	0.95	0.95	1.16	1.06	1.05	1.03	1.03

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP and N8 Program Balance SWO BA increases															
Accessions**=	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	0.87	0.84	0.84	0.83	1.09	0.94	0.91	0.91	0.90	1.18	1.01	0.98	0.98	0.97
O2	1.21	0.90	0.89	0.88	0.88	1.32	0.97	0.97	0.95	0.95	1.42	1.05	1.05	1.03	1.02
O3	1.04	0.88	0.85	0.87	0.87	1.13	0.96	0.93	0.95	0.95	1.22	1.04	1.01	1.03	1.03
Assume % of SWOs at YCS 9 fill O4 billets	0.98	0.83	0.80	0.82	0.82	1.07	0.90	0.88	0.90	0.90	1.16	0.98	0.95	0.97	0.97

*In this study, we estimate that the SWOCP taker/YCS 3 INV conventional SWO retention rate = 34.9% in the long term. When SWO(N)s are added, the estimated retention rate decreases to 33.4%.

**N13 accession plan (590 conv. SWOs + 120 SWO(N)s + 65 Options = 775; assumes no POCRs in), CNP approved plan (655 conv. SWOs + 120 SWO(N)s + 65 Options = 840; assumes no POCRs in), and this study's plan (653 conv. SWOs (includes Options) + 120 SWO(N)s + 65 Options = 838 accessions; assumes 68 POCRs in), respectively.



This slide shows the results for an even more vigorous “POCRs out” force shaping policy. Here we assume that 60 officers are moved out of the SWO community in each of YCS 4 and YCS 5. That is, a total of 120 POCRs are moved out of the community.

Compared to the results without a POCR out policy, the O3 inventory to BA ratios decrease by about 6 percentage points. Moreover, using the highest accession plan, assuming that some SWOs at YCS 9 fill O4 billets, and adding the N9 ISPP plus N8 Program Balance increases in BA, we estimate that this force shaping policy would result in greater O3 BA than inventory.

Appendix B

SWO inventory to BA ratios with various accession assumptions and retention = 37.4%*

50% of O1-O3 1000/1050 billets allocated to SWOs															
Accessions**=	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	1.01	0.97	0.97	0.96	1.09	1.09	1.06	1.05	1.04	1.18	1.18	1.14	1.14	1.13
O2	1.21	1.11	1.00	0.98	0.98	1.32	1.20	1.08	1.06	1.06	1.42	1.30	1.17	1.15	1.14
O3	1.18	1.16	1.14	1.12	1.12	1.28	1.26	1.24	1.21	1.21	1.38	1.35	1.33	1.31	1.31
Assume ½ of SWOs at YCS 9 fill O4 billets	1.11	1.09	1.08	1.06	1.05	1.21	1.18	1.17	1.15	1.14	1.30	1.28	1.26	1.24	1.23

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP SWO BA increase															
Accessions =	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	0.87	0.84	0.84	0.83	1.09	0.94	0.91	0.91	0.90	1.18	1.01	0.98	0.98	0.97
O2	1.21	0.90	0.89	0.88	0.88	1.32	0.97	0.97	0.95	0.95	1.42	1.05	1.05	1.03	1.02
O3	1.18	1.09	1.07	1.05	1.05	1.28	1.18	1.16	1.14	1.14	1.38	1.27	1.25	1.23	1.23
Assume ½ of SWOs at YCS 9 fill O4 billets	1.11	1.03	1.01	0.99	0.99	1.21	1.11	1.10	1.08	1.08	1.30	1.20	1.18	1.16	1.16

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP and N8 Program Balance SWO BA increases															
Accessions =	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	0.87	0.84	0.84	0.83	1.09	0.94	0.91	0.91	0.90	1.18	1.01	0.98	0.98	0.97
O2	1.21	0.90	0.89	0.88	0.88	1.32	0.97	0.97	0.95	0.95	1.42	1.05	1.05	1.03	1.02
O3	1.18	1.00	0.97	0.99	0.99	1.28	1.08	1.05	1.08	1.08	1.38	1.17	1.14	1.16	1.16
Assume ½ of SWOs at YCS 9 fill O4 billets	1.11	0.94	0.92	0.94	0.94	1.21	1.02	0.99	1.02	1.02	1.30	1.10	1.07	1.10	1.10

*N96 and the SWO OCM use a 37.4% SWOCP takers/YCS 3 INV retention rate that includes conventional SWOs and SWO(N)s.



**N13 accession plan (590 conv. SWOs + 120 SWO(N)s + 65 Options = 775; assumes no POCRs), CNP approved plan (655 conv. SWOs + 120 SWO(N)s + 65 Options = 840; assumes no POCRs), and this study's plan (653 conv. SWOs (includes Options) + 120 SWO(N)s + 65 Options = 838 accessions; assumes 68 POCRs), respectively.

This slide and the next two slides display results using various accession plans and assuming a 37.4 retention rate. In this scenario, we assume that the Navy does not employ a special POCRs out policy at YCS 4 and YCS 5.

Compared to the results when we assume a lower retention rate (33.4 percent), the inventory to BA ratios increase by 6 to 7 percentage points. As a result, even if the N9 ISPP and N8 Program Balance increases in BA were added, we estimate that a significant amount of O3 OOE would remain.

Appendix B

SWO inventory to BA ratios with various accession assumptions, retention = 37.4%*, and 60 POCRS out

50% of O1-O3 1000/1050 billets allocated to SWOs															
Accessions**=	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	1.01	0.97	0.97	0.96	1.09	1.09	1.06	1.05	1.04	1.18	1.18	1.14	1.14	1.13
O2	1.21	1.11	1.00	0.98	0.98	1.32	1.20	1.08	1.06	1.06	1.42	1.30	1.17	1.15	1.14
O3	1.15	1.13	1.11	1.09	1.09	1.25	1.22	1.20	1.18	1.18	1.35	1.32	1.30	1.28	1.27
Assume ½ of SWOs at YCS 9 fill O4 billets	1.08	1.06	1.04	1.02	1.02	1.17	1.15	1.13	1.11	1.11	1.27	1.24	1.22	1.20	1.20

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP SWO BA increase															
Accessions =	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	0.87	0.84	0.84	0.83	1.09	0.94	0.91	0.91	0.90	1.18	1.01	0.98	0.98	0.97
O2	1.21	0.90	0.89	0.88	0.88	1.32	0.97	0.97	0.95	0.95	1.42	1.05	1.05	1.03	1.02
O3	1.15	1.06	1.04	1.02	1.02	1.25	1.15	1.13	1.11	1.11	1.35	1.24	1.22	1.20	1.20
Assume ½ of SWOs at YCS 9 fill O4 billets	1.08	0.99	0.98	0.96	0.96	1.17	1.08	1.06	1.05	1.04	1.27	1.17	1.15	1.13	1.13

50% of O1-O3 1000/1050 billets allocated to SWOs + N9 ISPP and N8 Program Balance increases															
Accessions =	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	0.87	0.84	0.84	0.83	1.09	0.94	0.91	0.91	0.90	1.18	1.01	0.98	0.98	0.97
O2	1.21	0.90	0.89	0.88	0.88	1.32	0.97	0.97	0.95	0.95	1.42	1.05	1.05	1.03	1.02
O3	1.15	0.97	0.94	0.97	0.96	1.25	1.06	1.03	1.05	1.05	1.35	1.14	1.11	1.13	1.13
Assume ½ of SWOs at YCS 9 fill O4 billets	1.08	0.92	0.89	0.91	0.91	1.17	0.99	0.97	0.99	0.99	1.27	1.07	1.04	1.07	1.07

*N96 and the SWO OCM use a 37.4% SWOCP takers/YCS 3 INV retention rate that includes conventional SWOs and SWO(N)s.



**N13 accession plan (590 conv. SWOs + 120 SWO(N)s + 65 Options = 775; assumes no POCRs in), CNP approved plan (655 conv. SWOs + 120 SWO(N)s + 65 Options = 840; assumes no POCRs in), and this study's plan (653 conv. SWOs (includes Options) + 120 SWO(N)s + 65 Options = 838 accessions; assumes 68 POCRs in), respectively.

This slide shows the results when we assume the higher retention rate and a POCRs out policy that moves 60 officers in total out of the SWO community (30 at YCS 4 and 30 at YCS 5). Compared to the results without this force shaping policy, the inventory to BA ratios decrease by about 3 percentage points.

Appendix B

SWO inventory to BA ratios with various accession assumptions, retention = 37.4%*, and 120 POCRs out

50% of O1-O3 1000/1050 billets allocated to SWOs															
Accessions**=	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	1.01	0.97	0.97	0.96	1.09	1.09	1.06	1.05	1.04	1.18	1.18	1.14	1.14	1.13
O2	1.21	1.11	1.00	0.98	0.98	1.32	1.20	1.08	1.06	1.06	1.42	1.30	1.17	1.15	1.14
O3	1.11	1.09	1.07	1.06	1.05	1.21	1.19	1.17	1.15	1.15	1.31	1.29	1.27	1.24	1.24
Assume ½ of SWOs at YCS 9 fill O4 billets	1.05	1.03	1.01	0.99	0.99	1.14	1.12	1.10	1.08	1.08	1.23	1.21	1.19	1.17	1.17

50% of O1-O3 1000/1050 billets allocated to SWOs + N9I SWO BA increase															
Accessions =	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	0.87	0.84	0.84	0.83	1.09	0.94	0.91	0.91	0.90	1.18	1.01	0.98	0.98	0.97
O2	1.21	0.90	0.89	0.88	0.88	1.32	0.97	0.97	0.95	0.95	1.42	1.05	1.05	1.03	1.02
O3	1.11	1.03	1.01	0.99	0.99	1.21	1.12	1.10	1.08	1.08	1.31	1.21	1.19	1.17	1.17
Assume ½ of SWOs at YCS 9 fill O4 billets	1.05	0.96	0.95	0.93	0.93	1.14	1.05	1.03	1.02	1.01	1.23	1.14	1.12	1.10	1.10

50% of O1-O3 1000/1050 billets allocated to SWOs + N9I SPP and N8 Program Balance increases															
Accessions =	775 (no POCRs in)					840 (no POCRs in)					838 accessions (+68 POCRs in)				
Year end:	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
O1	1.01	0.87	0.84	0.84	0.83	1.09	0.94	0.91	0.91	0.90	1.18	1.01	0.98	0.98	0.97
O2	1.21	0.90	0.89	0.88	0.88	1.32	0.97	0.97	0.95	0.95	1.42	1.05	1.05	1.03	1.02
O3	1.11	0.94	0.92	0.94	0.94	1.21	1.03	1.00	1.02	1.02	1.31	1.11	1.08	1.10	1.10
Assume ½ of SWOs at YCS 9 fill O4 billets	1.05	0.89	0.86	0.88	0.88	1.14	0.97	0.94	0.96	0.96	1.23	1.05	1.02	1.04	1.04

*N96 and the SWO OCM use a 37.4% SWOCP takers/YCS 3 INV retention rate that includes conventional SWOs and SWO(N)s.



**N13 accession plan (590 conv. SWOs + 120 SWO(N)s + 65 Options = 775; assumes no POCRs in), CNP approved plan (655 conv. SWOs + 120 SWO(N)s + 65 Options = 840; assumes no POCRs in), and this study's plan (653 conv. SWOs (includes Options) + 120 SWO(N)s + 65 Options = 838 accessions; assumes 68 POCRs in), respectively.

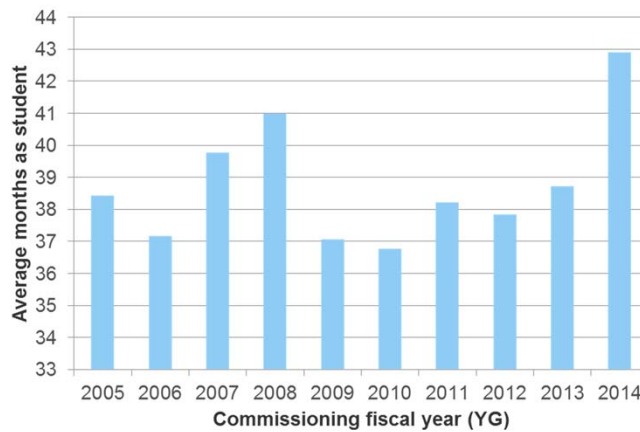
This slide shows the results when we assume the higher retention rate and an even more vigorous POCRs out policy that moves 120 officers in total out of the SWO community (60 at YCS 4 and 60 at YCS 5). Compared to the results with the smaller force shaping policy, the inventory to BA ratios decrease by about 3 percentage points.

Note that these ratios are nearly the same as the results obtained by assuming a 33.4 percent retention rate and no special POCRs out policy.

Appendix C

Appendix C provides some additional information on prior-enlisted SWOs.

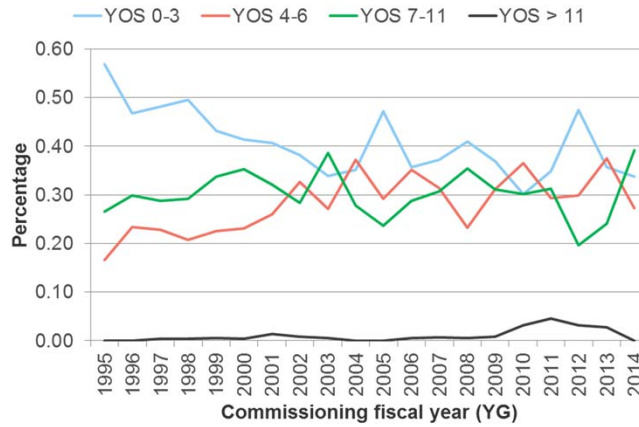
STA-21 SWO accessions: average time as a student in last enlisted assignment



This slide shows the average time that prior-enlisted SWOs spent as students obtaining their college degrees in order to be commissioned. The data show that prior-enlisted SWOs in these YGs spent on average at least 3 years, and in one case more than 3.5 years, obtaining their college degrees.

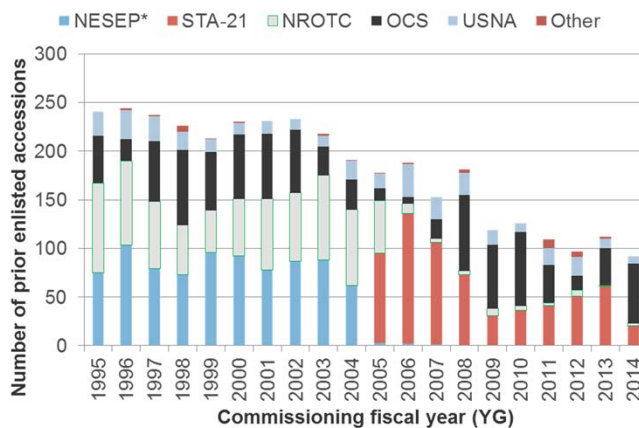
The time spent in school pursuing the degree is considered in the calculation of their pay, but it is excluded from the calculation of eligibility for military retirement.

Percentage distribution of prior-enlisted SWOs by adjusted YOS at commissioning*



*YOS is adjusted to reflect only service that counts toward retirement. For example, the time pursuing a bachelor's degree in the STA-21 program does not count toward retirement. We adjusted the YOS of prior-enlisted personnel to exclude their last enlisted assignment if it was as a student in the STA-21 or other enlisted-to-officer program and/or at an NROTC unit.

Prior-enlisted SWO accessions by source

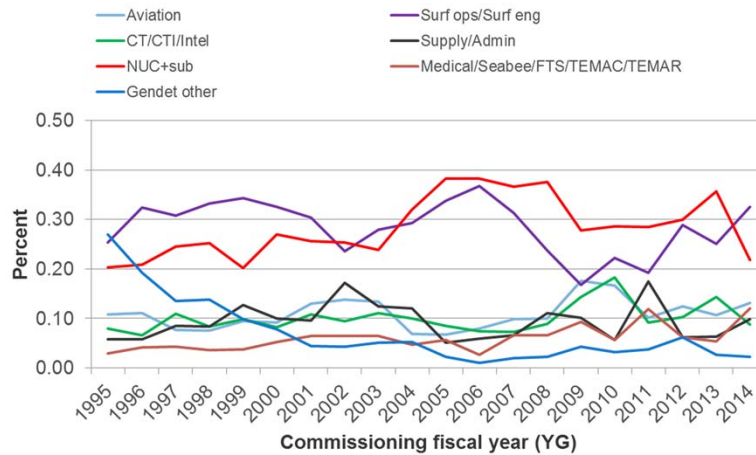


*Includes other enlisted-to-officer programs not accounted for in the other categories.



This graph shows that prior-enlisted SWOs are less likely to access through USNA and NROTC than in the past. Also, STA-21 replaced NESEP and other enlisted-to-officer programs in the early 2000s. According to officer personnel records, the program shift is recorded as occurring between 2004 and 2005. In several YGs since then, the proportion of prior-enlisted SWOs coming from the STA-21 program has decreased, while the proportion coming from OCS has increased.

Percentage distribution of prior-enlisted SWOs by EMC



As noted earlier in the presentation, the most common EMC groups from which prior-enlisted SWO accessions come are surface operations and surface engineering (combined in the graph), and nuclear and subsurface (combined in the graph). Prior-enlisted SWO accessions coming from these four EMC groups make up about half of all prior-enlisted SWO accessions. The remaining half come from a variety of combined EMC groups, none of which make up more than about 10 percent of prior-enlisted SWO accessions.

Thus, historically, about half of these accessions come from quite technical EMCs, skill sets for which there are already enlisted retention challenges. Note, however, that some sailors who are denied the opportunity to take part in an enlisted-to-officer program may be more likely to leave the Navy entirely. It would take more analysis to determine if limiting enlisted-to-officer movement would be a net gain or loss to these enlisted communities and the SWO community.



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